AVIATION WEEK

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SEPT. 18, 1950

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American Airlines

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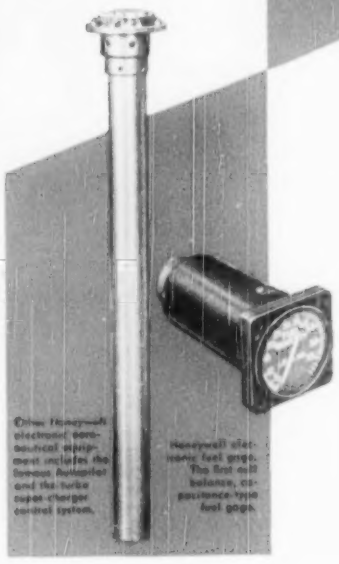

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MR. LAWRENCE states, "To us, the two important advantages of your gage are accuracy and dependability. We are now able to carry larger payloads with the Honeywell Electronic Fuel Gage, because this instrument affords indications having 51% less error than former methods used to indicate fuel supply." That's why 5 major airlines, like American, use Honeywell Electronic Fuel Gages. Minneapolis-Honeywell: Minneapolis 8, Minnesota. In Canada: Toronto 17, Ontario.

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Aviation Week

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Volume 53 · September 18, 1950 · Number 12

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PLANE AIR COMES "PACKAGED," TOO!

It stands to reason that the most serviceable and economical air conditioning system for an airplane is one designed and built *entirely by one manufacturer!*

For such a system on today's high-speed, high-altitude aircraft must be *completely integrated* to provide maximum comfort for airline passengers or military personnel during swiftly changing conditions of temperature and pressure.

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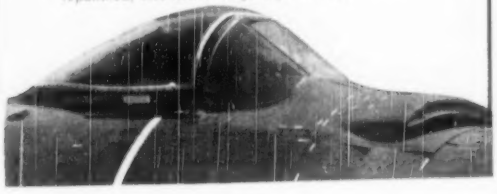
Photos courtesy Douglas Aircraft Co., El Segundo, California plant

IN THE PILOT'S COCKPIT of the Douglas Skyraider, the windshield of bullet-resisting Multiplate is flanked by two side panels of bent Flexseal, both developed by Pittsburgh. The windshield, precision reground and repolished, also acts as a gunsight reflector.



VERSATILE is the word for the Navy's powerful slugger. It is designed for "multiple types of combat service" including precision dive and skip bombing, pursuit, interception and strafing.

To take full advantage of this airplane's speed and maneuverability, the pilot must have instant accurate, unobstructed vision. That is why the windshield is Multiplate Safety Plate Glass, and the two flanking side panels are Flexseal, both developed by Pittsburgh.

Pittsburgh aircraft type Safety Glasses have won high preference among design engineers. More than half of all the glass now used in the American industry are supplied by Pittsburgh.

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NEWS DIGEST

DOMESTIC

Convair-Liner has been certificated by CAA for a gross takeoff weight of 41,790 lb., an increase of 1290 lb. First planes to be licensed under the new gross weight will be for Canadian Indonesian Airways, which has ordered eight, and two for Ethiopian Air Lines. The Turboliner, being built for General Motors with two Allison T-38 turboprop engines, also will have the higher weight.

First Boeing KB-29P flying boom aerial tankers have been delivered to the 97th Aerial Refueling Squadron at Biggs AFB, Texas. Boeing is training the tanker crews.

William A. Wildhack has been appointed head of the newly formed Office of Basic Instrumentation at the National Bureau of Standards. He formerly was chief of the bureau's Missile Instrumentation Section. Wildhack, with the bureau since 1937, has done extensive work in the field of oxygen equipment for high altitude flight.

American Airlines accident near Denver last month, when a propeller separates at an engine equal through the cabin of a DC-6, has been traced to an incorrect fit by a Curtiss-Wright worker which managed to get by company inspection.

Dr. John C. Southard, director of research at Solar Aircraft Co., San Diego, died Sept. 4. He was 44 years old. He was a member of the NACA subcommittee on aircraft structural materials.

New wind tunnel at California Institute of Technology has been named the "Merrill Tunnel," in honor of Albert A. Merrill, one of the oldest living aviation pioneers. Merrill, who built a wind tunnel at the Massachusetts Institute of Technology in 1906, was a contemporary of the Wright Brothers.

MATS will cut back 12 million ton-mile contracts on the trans-Pacific Airlift to present Sept. 20. A second 10 percent reduction is set for October. The September cut affects 32 prime contractor airlines, except those launched. Flying Tigers, Overseas National, and California Eastern. MATS is giving domestic transport strength on the Lesson Airlift to make up the difference.

Mc Donnell Aircraft Corp. is expanding its plant facilities at Lambert St. Louis Airport in preparation for its twin-jet Banshee Navy fighter production program. A $2.5 million new structure for testing, servicing and storing jet planes is the major show in the expansion program.

Pacific Automotive Corp. has been awarded an extension contract by AMC for towed, mobile overhead and wash rack a large number of military heavy engine cargo transport. The work will be done at the company's mesh assembly $2 million Pacific Automotive Airport, near Chino and Ontario, Calif.

Rear Adm. Calvin M. Bolster, USN, and Capt. James L. Hight, USAF, both are scheduled to receive National Aeronautic Council's 1950 awards for aviation research by armed forces members. Adm. Bolster, vice chief of BuAer for Research and Development, gets his award for work still confidential concerning the future of Naval aviation. Capt. Hight, of AMC's Equipment Laboratories, Wright Field, is being recognized for developing a highly [illegible] signal detector system.

FINANCIAL

National Airlines reports profit for the fiscal year ending June 30 of $355,203, compared with a net of $278,967 for the preceding year. Revenues of $12,910,123 were the highest in the company's history.

Consolidated Vultee Aircraft Corp. has declared a dividend of $3 a common share, payable Nov. 17 to holders of record Nov. 7.

Parker Appliance Co. reports net profit for fiscal year ending June 30 of $146,074 on sales of $7,101,551.

FOREIGN

Belgian Airline Sabena has contributed a second DC-4, with deposit [illegible] to the Pacific Airlift. The first Sabena plane has been operating across the Pacific for several weeks.

South African Airways has taken delivery of its first Gold Plate Constellation for the Johannesburg-London run. The Cosmos will fly to London three weeks. On intervening days, BOAC will fly the route using Hermes aircraft.

United Kingdom aircraft industry exports totaled about $10.5 million in July. The monthly average from January to July, 1950, had been $8.4 million.

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Get static-free communication and the added reliability of omni range navigation by installing A.R.C.'s Type 17 2-way VHF Communication and Type 15B Omni Range Navigation Equipment. With the 15B tuned to the VHF omni stations now covering the country, you fly directly in less time. You can receive weather broadcasts simultaneously with the navigation signals—*static free!* The 15B takes the work out of navigation and provides long, trouble-free life. The Type 17 provides an independent communication system for use while the 15B is busy providing navigational information. Other A.R.C. equipment provides LF range and broadcast reception, and rotatable loop navigation.

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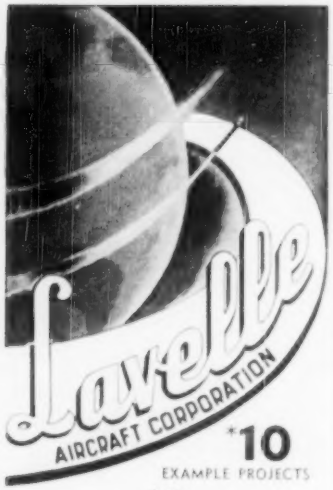

*10

EXAMPLE PROJECTS

*8

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Solution:

Charting of all mill heats for metallurgical characteristics and prescription of specific shop control for each heat in all welding operations.

Result:

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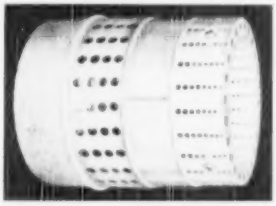

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AVIATION CALENDAR

Sept. 18-22—Fifth national instrument conference and exhibit. Memorial Auditorium, Buffalo, N. Y.

Sept. 19-21—Joint meeting on navigation and electronics, sponsored by the Institute of Navigation, the Radio Technical Commission for Aeronautics and the Radio Technical Commission for Marine Services. Hotel Astor, New York City.

Sept. 25-27—1950 national electronic conference. Edgewater Beach Hotel, Chicago.

Sept. 28-30—Aeronautic meeting and aircraft engineering display. Society of Automotive Engineers. Hotel Biltmore, Los Angeles, Calif.

Sept. 28-30—14th annual convention of International Northwest Aviation Council. Sun Valley, Idaho.

Oct. 3-5—Middle eastern district meeting, American Institute of Electrical Engineers, Baltimore, Md.

Oct. 5-7—Ninth annual convention, Air Line Dispatchers Assn. Congress Hotel, Chicago.

Oct. 9-12—Autumn meeting of National Academy of Sciences, General Electric Co. research laboratory, Schenectady.

Oct. 9-12—Fifth annual industrial packaging and materials handling exposition, Convention Hall, Philadelphia.

Oct. 12-13—1950 conference on airport management and operations, Max Westheimer Field, North Campus, University of Oklahoma, Norman, Okla.

Oct. 16-20—1950 annual general meeting of the International Air Transport Assn., Fairmont Hotel, San Francisco.

Oct. 18-20—Annual national conference of the Society of the Plastics Industry, Inc., in cooperation with Harvard Business School, Soldiers Field, Mass.

Oct. 22-28—31st annual meeting, American Welding Society, Hotel Sherman, Chicago, Ill.

Oct. 24-25—Third biennial Materials Handling Conference, sponsored by Westinghouse Electric Corp., Hotel Statler, Buffalo, N. Y.

Oct. 25-26—Flight Safety Foundation annual Safety Seminar, Denver, Colo.

Oct. 26-27—Fifth annual Arizona aviation conference, sponsored by the aviation committee of the Tucson Chamber of Commerce, Tucson, Ariz.

Nov. 29-Dec. 1—Eighth annual meeting of Aviation Distributors and Manufacturers Assn., Ambassador Hotel, Los Angeles.

Dec. 16-17—4th Wright Brothers Lecture, Institute of Aeronautical Sciences, U. S. Chamber of Commerce Auditorium, Washington, D. C.

Jan. 13-18, 1951—Plant maintenance show and conference, sponsor on plant maintenance techniques, Cleveland, Ohio.

Jan. 29-Feb. 1—27th annual meeting of the Institute of Aeronautical Sciences, Hotel Astor, N. Y.

May 3-8-Sept. 9—World Transportation Exposition, Santa Anita Park, Arcadia, Calif.

PICTURE CREDITS

p. 7—Counter & bottom: Goodyear. (2—top) & (3) (center) Goodyear. (center, right) Hartford. (bottom right & left) Kaiser. 18—Wood. Newsphoto. (upper) A. Lower (center) Goodyear. (bottom) Goodyear. 21—Alexandria. 28, 29, 32—Hans Wendt. 31—Acme. 16—CAL.

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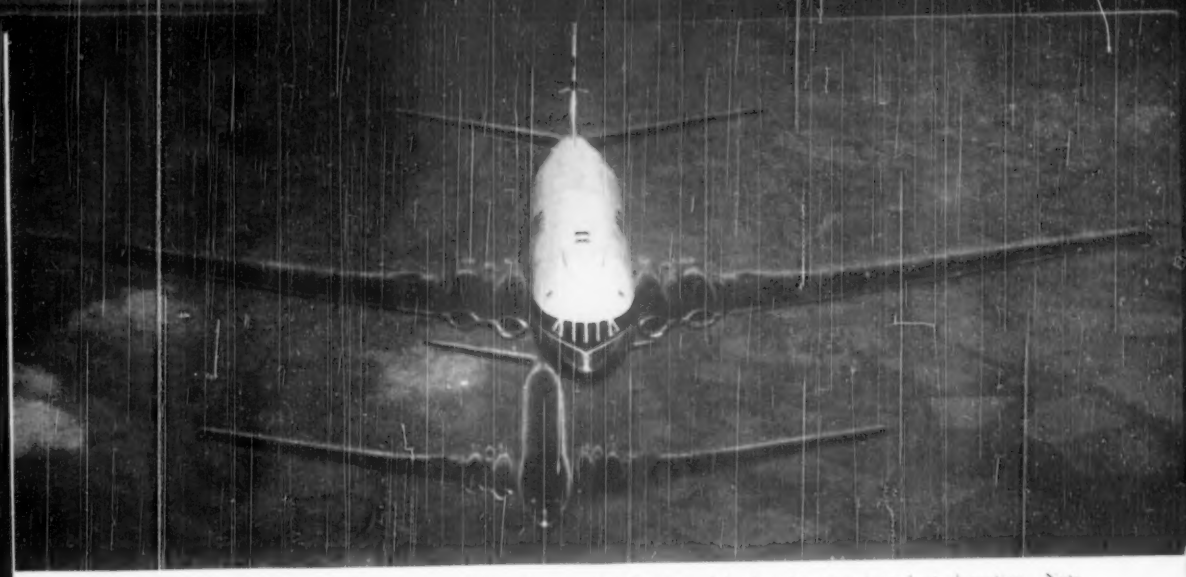


TWO DH COMET TRANSPORTS fly an unusual formation. Production version, at top, shows its new BOAC markings, including white-topped fuselage for minimizing heat absorption. Note close grouping of four DH Ghost turbojets, rated at 5000-lb. thrust.

SHORT S.B.3 SUB HUNTER (above) displays its grotesque, bug-like nose while flying on one of its two Armstrong Siddeley Mamba turboprop engines. The unusual proboscis houses complex radar gear. Based on the Sturgeon design, the S.B.3 is Short's first gas-turbine-powered plane, and is intended for use off carriers.

SBAC Show Headliners

AVRO ASHTON 1 RESEARCH PLANE (right), powered by four Rolls-Royce Nenes is derived from the Tudor series, incorporates tricycle landing gear. Six have been ordered by the British Ministry of Supply for extensive testing at altitudes of 40,000 ft. and over. Each of the six will be used on one specialized branch of investigation.

WHO'S WHERE

In the Front Office

In a reorganization of top management, **Thomas L. Grace**, formerly Slick Airways vice president-operations, has moved up to the presidency of the freight line, replacing founder **Earl F. Slick**, who retains his position as chairman of the board. **William F. Hollan**, western division sales manager, has been elected executive vice president, replacing **Lewis J. Moorman, Jr.**, who became vice chairman of the executive committee and vice chairman of the board.

Slick and Moorman will continue to give their full time to the airline's activities. Other top-level changes include **Joseph F. Grant** to vice president-secretary, **David R. Stewart** to vice president-treasurer, **H. P. Huff, Jr.**, operations manager, and **M. C. Wilkin** as general sales manager.

Fred J. Knerr has been appointed to the newly created position of manager, material and engineering, charge control in Curtiss-Wright's Propeller division. Knerr, who has been with C-W for over 10 years, was previously supervisor of material control since 1947. Following his transfer from the company's engine division.

Alexander T. Burton has been named vice president of North American Aviation. For some years the firm's Washington liaison office, Burton had been serving as assistant to the president since June, in charge of sales coordination and customer relations.

Travel Log

HAVING HELPED PAVE THE WAY—Sir Keith M. Smith, who made the first flight from England to Australia in 1919 with his brother, Ross Smith, probably spent some time in interesting reflection during his recent flight to London aboard a BOAC Stratocruiser which he is seen boarding at N. Y. International Airport. Sir Keith, since 1924 general representative of Vickers Armstrong, Ltd., in Australia, made his historic flight in a strut-and-wire-braced Vickers Vimy twin-engine biplane.

INDUSTRY OBSERVER

► A design competition for convertaplanes, aircraft that can fly vertically like helicopters and horizontally like conventional planes, is now being set up by the Air Force and Army at Wright Field. Specifications will be sent out to manufacturers within two weeks.

► **Navy is running evaluation tests at Patuxent NAS, with a Sikorsky H-19A rescue helicopter on loan from the Air Force, fitted (in advance of receipt of the first of 10 anti-submarine HO4S-1 helicopters) with amphibious float-wheel landing gear. Navy does not expect to buy the float gear, but will specify conventional wheel gear to save the extra weight and convert it into payload. Navy version will be 300 lb. lighter than the H-19A.**

► Reserved status of American pilots and ground personnel working for "friendly nation" airlines is a real headache to those airlines right now. State Dept. is seeking to work out arrangements with Department of Defense so the friendly nation airlines such as Ethiopian, TACA, Saudi Arabian and Philippine Airlines will not be too seriously crippled by reserve calls to active duty.

► **Lightplane manufacturers who have not yet got going on military contracts are beginning to feel the materials pinch. Hardest hit are small companies now developing new experimental models, not yet certificated. Jamieson Aircraft Co. at Deland, Fla., whose Jupiter personal plane is just about ready for its long-delayed certification, is now looking with interest to the plane's military possibilities as a radio-controlled target plane. The head of the company, Charles Jamieson, is credited with design of most of the Culver target planes of World War II.**

► Glenn L. Martin Co. is expected to ask for another RFC loan to finance the construction of the 10 additional 4-0-4 transports which TWA has ordered.

► **Helio Aircraft Corp., Norwood, Mass., is booking orders for its new Helioplane Four slow-flying plane, at $8000 a plane. The production prototype had not yet flown early in September, due to delays in receipt of important purchased components. Orders are contingent on completion of CAA certification.**

► The long-awaited encounter between McDonnell Banshee Navy jet fighters and a USAF Convair B-36 intercontinental bomber took place in the New York area toward the end of May. Both sides agree that the encounter didn't prove too much, since it was at 47,000 ft., well below the big bomber's best operating altitude, and the B-36 was one of the early unmodified versions without the jet pods which add so materially to its performance.

► **First reserve plant to be opened under expanded military requirements is expected to be the World War II Dodge plant at Chicago where the Ford Motor Co. is going to make Pratt & Whitney R-4360 engines under license agreement arranged under industrial mobilization plans.**

► Boeing Airplane Co., stepping up production of its jet engine B-47 bombers to meet USAF needs for a company B-47 SAC wing by fall 1951, is now hard at work ironing out design problems for a turboprop version of the medium bomber. Main difficulty is compensating for the aerodynamic change which means in the swept-back wing flexing 42 in. from dihedral to anhedral (negative dihedral) when in flight.

► **Beech Aircraft Corp., Wichita, despite increasing orders from USAF and Navy, has managed to keep production of the Bonanza up to 12 planes per week. Main plant is concentrating on supplying USAF with E-80 265 gal. wingtip tanks. Production and shipping of the droppable tanks is presently under way without official contract or letter of intent.**

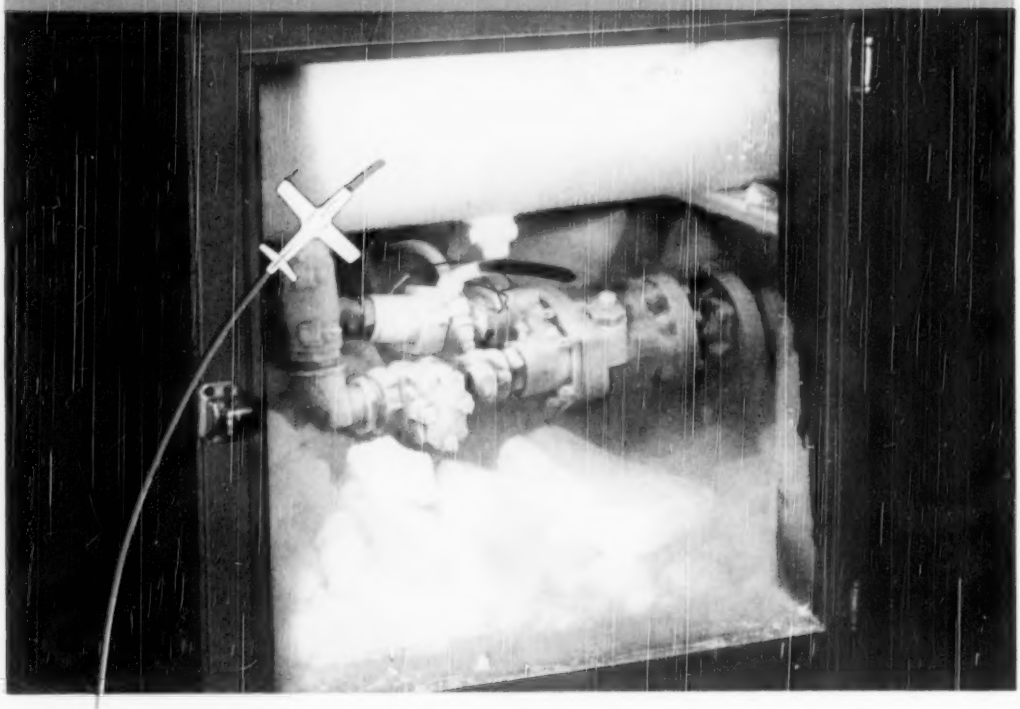
► Aircraft Armaments Inc., Baltimore, headed by Harry T. Rockland, president of Skyline Inc., Washington, currently employs 22 men on [illegible] at Baltimore, Md., plant. Plans are to increase research personnel to 100 by end of the year. Many of planned AAI personnel [illegible] general from Glenn L. Martin Co.

Air Force's all-weather, high-altitude interceptor, the North American F-86D, with Hamilton Standard's air cycle refrigeration unit

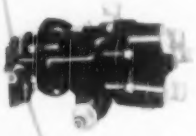
HAMILTON STANDARD

W H E R E V E R M A N F L I E S

Performance Points to Pesco First!



BROTHER, IT'S AS COLD IN HERE
. . . as it is 7 miles straight up!



Pesco fuel pump under test provides for both normal and emergency operation of 22 g.p.m. at 500 p.s.i. at 3,400 r.p.m.

It's 70°F below zero inside this "Cold Box", yet the Pesco dual, high-pressure fuel pump you see coated with ice starts readily, and goes right along pumping 1,300 gallons of jet engine fuel every hour . . . hour after hour.

This is only one of many equally severe and grueling tests to which Pesco fuel pumps are being subjected continuously in Pesco's new fuel pump test laboratory . . . a complete building in which every condition under which the latest jet planes must operate can be simulated accurately.

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AVIATION WEEK VOL. 53, NO. 12
SEPTEMBER 18, 1950

CAA's New Avionics Program Disclosed

$53 million to be spent in fiscal '52 if budget is Okayed.

By Charles Adams

The Civil Aeronautics Administration hopes to pour more than $53 million into its fiscal 1952 program for establishment of air navigation facilities in continental U. S., the Caribbean, Alaskan and Pacific areas.

Much of the money—$17,925,000—will be used for procurement and installation of new equipment to implement the Radio Technical Commission for Aeronautics' transitional all-weather airways (SC-31) program. For the first time, funds would be used for procurement and installation of Airport Surface Detection Equipment—a new radar-type system which will help controllers "see" and regulate traffic on runways and taxiways during periods of bad visibility.

► **Testing Program**—ASDE is being developed by the Air Force at its Watson Laboratories in Red Bank, N. J. Bulk of the project consists of improving experimental models already in existence.

Test five ASDE systems are planned for early fall at Boston, Chicago, Los Angeles, New York (Idlewild) and Philadelphia during fiscal 1952. CAA expects that this will cost a total of $1 million, $200,000 apiece.

At least the phase of RTCA's transitional period SC-31 program is to be completed during fiscal 1952. CAA also to establish distance measuring equipment at 159 ILS and 39 VOR facilities during the year. This will complete the DME program and establish a network comprising 177 ILS/DME and 454 VOR/DME facilities within continental U. S.

Contracts for 450 DME ground stations costing $4,210,000 were let by CAA last March to Hoeltine Electronics Corp., Little Neck, L. I., N. Y. (AVIATION WEEK March 20). The 190 additional facilities planned in fiscal 1952 will cost $22,000 each or a total of $4,180,000.

►**Changes Likely**—Other items making up the proposed $17,925,000 expenditure for continuation of the SC-31 program in continental U. S. during fiscal 1952 are listed below. It should be emphasized that the program is subject to radical change before it is approved by the Budget Bureau and Congress.

All-Weather Airways Progress

Type of Facility	Quantity for Continental U. S. Fiscal 1950 & Before	Fiscal 1951*	Fiscal 1952
VHF omniranges (VOR)	399**	20	35
High intensity approach lights	20	13	38
Distance measuring equipment			
a. at VOR	119	0	35
b. at ILS	20	0	155
Airport surveillance radar	45	10	16
ADF-MDF (for use with ASR)	44	12	16
Precision approach radar	21	7	16
Mechanical interlock	30	12	0
Airport surface detection equipment	0	0	5

* Quantities subject to change when amount of appropriation has been determined by the Congress.

** Sixty-seven of these are now VAFIs and are being converted to VOFIs under the current establishment program.

(Note: 92 ILS installations have been completed in continental U. S. to date. About 170 are to be in operation at the end of fiscal 1951.)

• **VHF Omniranges**—35 units at $[illegible] each ($2,200,125 total). Some of these VHF omniranges are to be established for use as terminal approach aids at airports. Twelve are expected to fill signal coverage gaps within continental U. S. In addition, provision will be made for establishment of new omniranges to satisfy both en route and terminal requirements.

New omniranges are slated for Bradford, Pa., Buffalo, Tex., Cambridge, Md., Clarksburg, W. Va., Commerce, Ind., Dunham, Utah, Ely, Nev., Gaston, Ore., Gainesville, Fla., Grand Marais, Mich., Houghton, Mich., Huntington, W. Va., Kane, Pa., Kingman, Ariz., Klamath Falls, Ore., Kokomo, Ind., La Grande, Ore., Las Vegas, Nev., Lake Charles, La., Lancaster, N. Y., Lebanon, N. H., Machias, Me., Meridian, Miss., Montpelier, Vt., Monroe, Mich., Nez Perce, Idaho, Newport News, Va., Pecos, Kans., Richmond, Ind., Roanoke, Va., Roseburg, Ore., Saginaw, Mich., Sault Ste. Marie, Mich., Stockton, Calif., Traverse City, Mich., Twin Falls, Idaho, Wells, Nev., Williamsport, Pa., and Zanesville, O.

• **High Intensity Approach Lights**—38 systems at $[illegible] each ($3,725,100 total).

These new high intensity approach lights are to be installed at Albany, N. Y., Amarillo, Tex., Augusta, Ga., Austin, Tex., Beaumont, Tex., Buffalo, N. Y., Camden, O., Charleston, W. Va., Charlotte, N. C., Chattanooga, Tenn., Cleveland, O., Columbus, O., Dayton, O., El Paso, Tex., Fort Wayne, Ind., Great Falls, Mont., Greensboro, N. C., Greenville, N. C., Harrisburg, Pa., Jacksonville, Fla., Little Rock, Ark., Milwaukee, Wis., Mobile, Ala., Norfolk, Va., Oberlin, Kans., Providence, R. I., Raleigh, N. C., Richmond, Va., Salt Lake City, Utah, San Antonio, Tex., Shreveport, La., Spokane, Wash., Syracuse, N. Y., Tampa, Fla., Tulsa, Okla., Wichita, Kans., Wilkes Barre, Pa., and Windsor Locks, Conn.

• **Airport Surveillance Radar**—16 units at $[illegible] each ($[illegible] total).

ASR facilities will be established at Albany, N. Y., Augusta, Ga., Chattanooga, Tenn., Fort Wayne, Ind., Great Falls, Mont., Greensboro, N. C., Greenville, S. C., Little Rock, Ark., Omaha, Nebr., Raleigh, N. C., Syracuse, N. Y., Tampa, Fla., Toledo, O., Wichita, Kans., Wilkes Barre, Pa., and Windsor Locks, Conn. An additional facility will be procured for training purposes.

• **VHF Automatic Direction Finder**—[illegible] at $[illegible] each ($[illegible] total).

These 16 units are planned for the 16 airport surveillance radar installations above. Two additional facilities will be procured for training purposes.

• **Precision Approach Radar.** 16 facilities at $182,230 each ($2,915,680 total).

These units will be established at: Austin, Tex.; Charleston, W. Va.; Charlotte, N. C.; Dayton, O.; Fort Worth, Tex.; Jacksonville, Fla.; Long Beach, Calif.; Milwaukee, Wis.; Minneapolis, Minn.; Mobile, Ala.; Norfolk, Va.; Providence, R. I.; Salt Lake City, Utah; San Antonio, Tex.; Spokane, Wash.; and Tulsa, Okla. An additional facility will be procured for training purposes.

Of the overall total of $53,827,000 slated for establishment of all types of air navigation facilities during fiscal 1952, $46,741,000 would be spent in continental U. S., $845,000 in the Caribbean, $2,919,000 in Alaska and $3,323,000 in the Pacific. Besides the $17,925,000 planned for implementation of the SC-31 program in continental U. S., money would be spent domestically for such items as relocating VOR ranges ($632,315); automatic voice identification in connection with omni ranges ($801,900); VOR improvements ($214,240); omni test signal transmitters ($364,320); relocation of existing ILS facilities and compass locators ($344,050); provision for glide path flare feature ($526,100); localizer voice channel improvements ($64,255); portable field detectors for glide path ($581,000); and replacement of localizer field detectors ($43,650).

▶ **Video Mapping**—In connection with airport surveillance and precision approach radar, funds would go for video mapping ($224,000) and antenna installations ($1,355,210).

Lighting of terrain obstructions in the vicinity of airports would cost $275,982; dismantling of L/MF facilities $292,082; establishing radio homing beacons $122,500; relocating item light lines $209,000.

Airborne equipment funds provide for 70 VHF radio communications transmitters costing $124,600; 20 VHF navigational receivers $58,500; 40 receivers and DC amplifiers $33,325; 20 test sets for 75 mc. marker beacon receivers $16,200; 20 portable test sets for DME interrogator $224,000; 70 portable test sets for VOR navigational receivers $70,280; 7 automatic pilots $102,775; 5 gyroscopic computers $6,280; and 48 airborne safety transponders $60,770.

▶ **ATC Towers**—At air traffic control towers, major expenditures include $194,170 for establishing 8 ATC towers; $244,220 for relocating 16 ATC towers; $131,010 to establish 3 mobile towers; $1,014,000 to install 48 approach sequence display units; and $2,574,000 to install 78 daylight radar scopes in towers.

At air route traffic control centers, $659,675 would be used to install daylight radar scopes at 15 points; $1,144,000 for 26 inter-center emergency radio communications units; $452,140 to install new VHF equipment at existing stations for new VOR facilities; $344,000 to install 100 additional console operating positions and $1,111,000 to install 100 azimuth indicators (VHF/ADF).

Plane Licensing

Two U. S. fighters, two transports likely to be manufactured abroad.

Two current production jet fighters and two cargo aircraft are being considered by Defense Department for licensing and manufacture in foreign nations allied under the North Atlantic Treaty Organization.

Funds set aside for industrial defense development in NATO nations now total $475 million plus, with the lion's share of that amount scheduled for aircraft industrial development.

▶ **Fighters**—USAF fighters which are likely candidates for foreign licensed manufacture are North American F-86 Sabre, already in production in Canada by Canadair, Ltd., and the Republic F-84. Already scheduled for shipment to NATO nations are more than 300 F-84 Thunderjet fighters.

▶ **Transports**—Among cargo transports under consideration for foreign manufacture are the Fairchild C-119 and the Douglas-owned Canadair DC-4M. Fairchild Engine and Airplane Corp. had been approached previously in connection with possibility of licensing the C-119 for manufacture both in Canada and in England. The company is reported to have turned down both the Canadian and the British production offers.

Revised fiscal year 1950 estimate of financial support to give impetus to industrial defense potential for treaty nations was set at $18,326,000. These funds, however, were virtually frozen to expenditure on basic commodities only and provided no real assistance at building industry.

New legislation provided for in the fiscal 1951 budget boosted the ante to $75 million. The supplemental bill introduced by President Truman added another $400 million to the industrial development pool. It also provided for actual industrial assistance such as machine tools, equipment.

Of the $475-million total, the Defense Department estimates that approximately $110 million is allocated for rebuilding and expanding the treaty nations' aircraft industry. Production potential as a result of that expenditure is estimated at approximately $607 million worth of tactical aircraft. This does not include engine production which is figured to be $64 million.

Breakdown of the proposed $475 million expenditure indicates that the production potential of NATO nations would eventually return defense equipment totaling $2480 million for the Western group of nations.

▶ **Tactical Aid Deficient**—Conferences between nations allied under NATO agreed that military production of aircraft for individual air defense was sufficient to meet the minimum need. As a result the supplemental appropriation bill is designed to provide for assistance to NATO nations in emphasizing the tactical and cargo aircraft industry potential.

Money for Subcontractors

More than $2 billion of the $7.5 billion USAF/Navy procurement money will go to subcontractors, it is disclosed in an AVIATION WEEK survey of the prime airframe and engine manufacturers who will get the bulk of the procurement funds.

For the time being, most of the prime manufacturers have sufficient subcontractors according to the survey, full results of which will appear in AVIATION WEEK's annual "Procurement for Air Power" to be published next week. But still the prime manufacturers are interested in locating potential new subcontractors in case their government commitments should become larger.

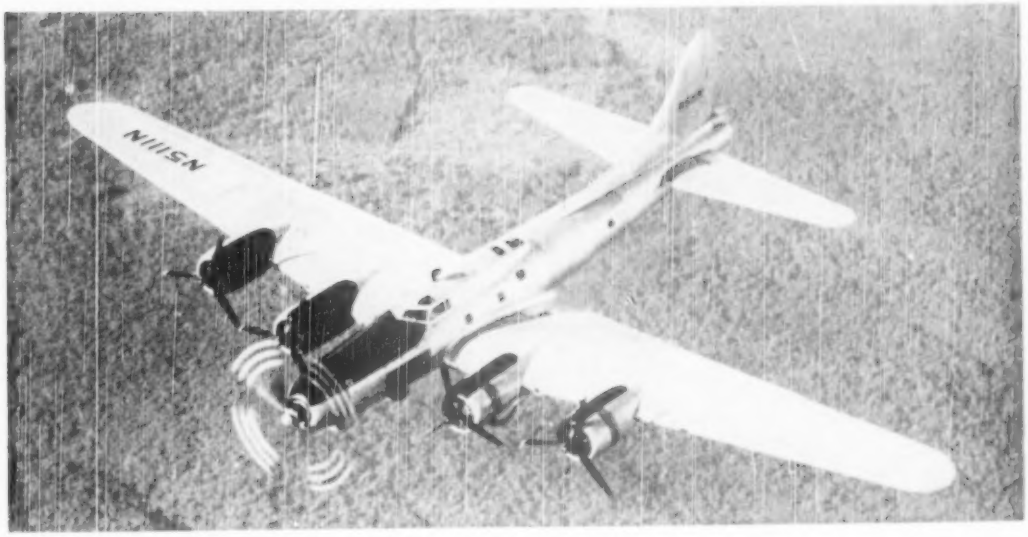
Most active manufacturer in using subcontractors probably is Pratt & Whitney Aircraft division of United Aircraft, which will pass on at least 40-percent of its government money to subcontractors. Subcontracting at PAW has been established policy since organization of the engine firm in 1926.

The survey reports the manufacturers' experience and difficulties in obtaining subcontractors with the proper qualifications, and sums up the requirements each manufacturer would like in a subcontractor.

Estimates being programmed at the Department of Defense also provide for meeting deficiencies in all activities relating to air power. Major emphasis is to be given industries developing radios, radar and wire communications, ammunition, bombs, rockets, machine guns.

Parallel procurement is planned for motor transport and special purpose vehicles for aircraft refueling and operations.

Current thinking at the Pentagon is to standardize on the North American F-86 and the Republic F-84 as backbone of the NATO fighter and fighter-bomber needs insofar as the U. S. contribution to NATO defense is concerned. Thinking in the contemplated transport licensing for overseas manufacture has still not been crystallized, however.



Turboprop Future Seen Bright

Great power and low fuel consumption of P&W T-34 foreshadows increased utility for turbine-propeller craft.

By Alexander McSurely

Patuxent River, Md.—Barring misfortunes which sometimes happen, the future of the turboprop engine looks rosy.

Experts at the Navy Air Test Center here predict that within two years turboprop engines will be flying with at least 7000 equivalent shaft hp. and with specific fuel consumption below 0.5 lb./hr./hp.

The most powerful turboprop flying in this country currently is the new Pratt & Whitney T-34 single-turbine unit, rated at 5700 equivalent shaft hp. and with a specific fuel consumption of 0.62 lb./hr./hp. (AVIATION WEEK Sept. 11, p. 12). The T-34 made its first public demonstration last week to the aviation press at Patuxent, when it was flown in the nose of a B-17 testbed.

Rear Adm. A. M. Pride, chief of the Navy Bureau of Aeronautics, praised the flying test bed method of testing new engines, as a short-cut in development work.

Both Pratt & Whitney and Allison, he said, had saved much time by this method, as much as two years in the case of Pratt & Whitney.

▶ **Biggest Engine**—Perry Pratt, assistant chief engineer of Pratt & Whitney, compared the fuel consumption of the biggest piston engine, the P&W R-4360, which is 0.821 lb./hr./hp., with that of his company's new engine. Pratt said that his company does not expect to develop a larger piston engine than the R-4360.

The forecast of less than 0.5 fuel consumption and 7000 hp. was given by Lt. Comdr. Robert B. Clark, of the powerplant section, Bureau of Aeronautics.

Emphasizing the potential of turboprop planes for long range work, Navy officers cited the new Douglas A2D turboprop attack plane, which was described as about 200 mph. slower than jet planes of comparable size, but able to carry three times the load, and able to cruise with jet fighters, with appreciably longer endurance.

Although there are no piston engines of comparable power, a hypothetical piston-engine attack plane of comparable size might have about the same top speed as the turboprop, but would have a much lower cruising speed, they said.

▶ **Navy Jets**—Navy jet fighters demonstrated speed and maneuverability in comparison with piston-engine planes, in a flypast for the aviation press, which was climaxed by a flight show of the new turboprop engine in an B-17 testbed.

Harold Archer, Pratt & Whitney chief test pilot, flew the plane with all four of its piston engines feathered. He made a low pass about 150 ft. above the runway, and then put the plane into a steep climb using only the turboprop power. The single turboprop engine actually is more powerful than all four of the piston engines combined.

Catapult take-offs were made by a McDonnell Banshee F2H-2, a Douglas AD-2 attack plane and a Grumman F9F-3 Bearcat, followed by a rocket-assist take-off made by a Lockheed P2V Neptune. A Sikorsky H-19 on loan from USAF rounded out the lineup.

An AD-2, modified dive-bombing one, and low level passes by a Vought F4U-5, a Grumman F9F, a North American AF-1, a Douglas F3D, the Banshee, and a Vought F7U-3 Cutlass completed the flight show.

The bridge-shipping pass of the F3D and the odd-looking near-vertical landing attitude of the F7U were the most interesting spectacles which were seen at the show.

NWA vs. Boeing

Stratocruiser suit seen as having effect beyond immediate damage issue.

Northwest Airlines' suit, filed in the U. S. District Court at Seattle against Boeing Airplane Co. for damages of $24,798,506, is bound to have a series of implications beyond this specific proceeding.

This action by Northwest is premised on the allegation that Boeing was so late in delivering 10 Stratocruisers that the carrier incurred heavy losses. Also, the suit charges the high maintenance costs of the plane and the failure of daily utilization to meet the original specifications caused serious economic losses to Northwest. Excessive cost of spare parts by Boeing to Northwest is also claimed and made part of the suit.

Delivery of the planes was originally scheduled to start January, 1947, but actually did not get started until June, 1949. This, the complaint charges, resulted in a loss of potential revenues and profits to Northwest of $16,678,000.

▶ **Boeing Stand**—Boeing, on the other hand, considers that it has satisfactorily fulfilled all the requirements of the contract with Northwest on the Stratocruisers and officially notes that Northwest has no basis for any actual seeking damages. Moreover, Boeing points to the 28 million Stratocruiser miles of world service by five airlines without serious accident as further substantiation of its position.

The Northwest action is viewed by informed observers as a face-saving gesture to remove the onus of its long spotty record and duff this responsibility elsewhere.

▶ **NWA Problems**—It is well-established that Northwest has been in serious financial straights and is also faced with a reduction of its high subsidy mail pay in its international service.

It is known that Boeing's contracts are very tight legal documents and it may prove exceedingly difficult to prevail in resisting the company in any legal action.

The entire matter is also delicate in that the Northwest complaint, although disclaiming any dissatisfaction with the actual safety performance of the plane, does set up some mental reservations in the minds of any would-be travelers on this equipment.

This condition not only pertains to Northwest but will also apply to United's Hawaiian service and the operations of Pan American's Stratocruiser fleet. ACA's Boeing equipment will soon be absorbed by Pan American.

—S. A.

Britain Displays Year's Work

Farnborough exhibits are mainly modifications of 1949's prototypes; turbine progress revealed.

By David A. Anderton

Farnborough, Eng.—The 1950 show of the Society of British Aircraft Constructors indicates the stress placed during the past year on improving and modifying 1949's prototypes which now are entering production. It also revealed further progress in turbine power plants.

The past year has not wrought much change on the face of British aviation. Of the 20 or so "new" airplanes which flew this year, most exciting were the sweptwing Hawker P. 1081 and Vickers Supermarine 535 (see page 15). Both are powered by Rolls-Royce Nenes, and both are developments of earlier types.

▶ **Vickers Fastest**—Supersonic in speed probably goes to the Vickers 535, which uses afterburning, and has a higher wing loading; it reached Mach .86 in a high-speed fly-by in poor weather.

The tiny P. 1081 is remarkably agile and has a high rate of roll. Assuming both planes were demonstrated at full throttle, the Hawker was only slightly slower than the 535.

▶ **Fast Climb**—The runner up for spectacular display was the Avon Meteor, with the new series of Avon jet engines currently developing something over 8000 lb. thrust. The plane averaged 6 seconds from standing start to being airborne, and showed a phenomenal rate of climb. Some stop-watching, and knowledge of the height of the cloud base gave an estimated climb of 15,500 fpm.

On the transport side, the Underpowered Vickers Viscount 701 whistled over the crowd, sporting British European Airways red markings. This plane, the first of 28 ordered by BEA, has a longer fuselage, greater span and wider engine spacing than the prototype.

The second de Havilland Comet also appeared, flying with the prototype. Biggest plane to fly over was the Bristol Brabazon I. The second largest plane in the show—the Universal Freighter—demonstrated excellent takeoff performance and flight steadiness, even though it was flying empty.

▶ **Research Planes**—Three research craft made their appearance at the show. Two of these are high-altitude flying laboratories. The Avro Ashton with four Nenes, and the Vickers Viscount converted to two Rolls-Royce Tays. They are pressurized for operation at 50,000 ft. and are intended to obtain flight test data.

The Avro 707B, the second model of a delta-wing research plane, was flown in on the second day. The first 707, which was shown last year, was lost in a crash after the 1949 show. The new version has a longer nose and uses a chute for braking during the landing run.

Engine flight test beds which flew, in addition to the Avon Meteor, include Proteus Lincoln, carrying new Bristol Proteus turboprops (3500 equivalent hp.) in outboard nacelles for the first airborne tests, and the Sapphire Meteor, first flown late in August, powered by two new Armstrong Siddeley jets. Although the Sapphire thrust now is below the latest series of the Avon, both engines are aimed at an eventual 9000 lb. thrust.

Center Will Survey Air Safety Research

A survey of world-wide activities in aviation safety research is being undertaken by a newly formed organization, the Daniel and Florence Guggenheim Aviation Safety Center.

The center will be headed by Jerome Lederer, as director, and he operates under the auspices of Cornell University, with offices at 2 East 64th Street, New York City. Lederer will continue as president of Flight Safety Foundation.

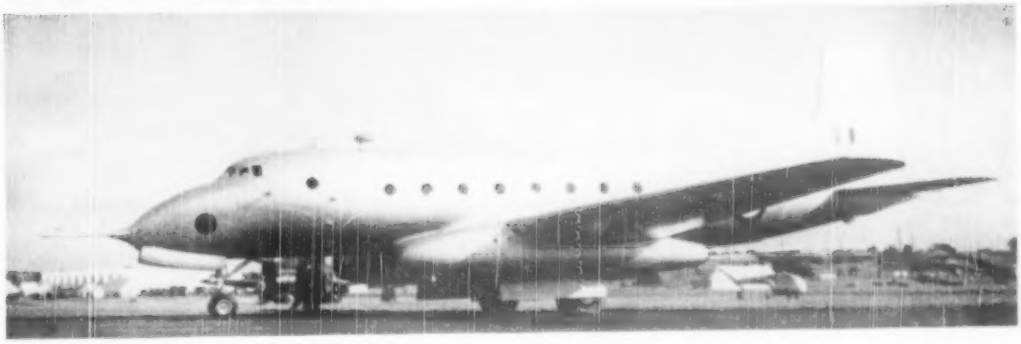
The new group is intended to complement and encourage other aviation safety organizations, rather than overlap or duplicate any of them. One of its purposes is to promote safety research at "qualified institutions." The survey of work now being done in this field, on which an interim report will be issued in December—is intended to lay the groundwork for aid in areas not now being covered by safety research.

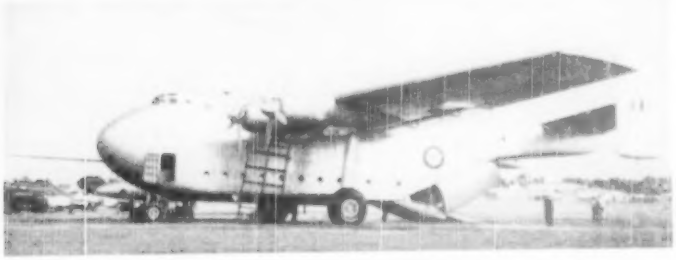
The center was established by the Daniel and Florence Guggenheim Foundation, which has appropriated $180,000 for the center's initial work.

Harry F. Guggenheim, president of the foundation, said: "The objectives of the center will be to achieve safety in aviation as effectively as we have achieved speed and efficiency."

The center will be under the supervision of an executive committee, chairmanned by Dr. T. P. Wright, vice president for research at Cornell and former Administrator of Civil Aeronautics. The survey of current aviation safety research is being conducted by Roland M. Woodhom, former administrator of the Standard Aeronautical Index.

Seen at the SBAC Show . . .

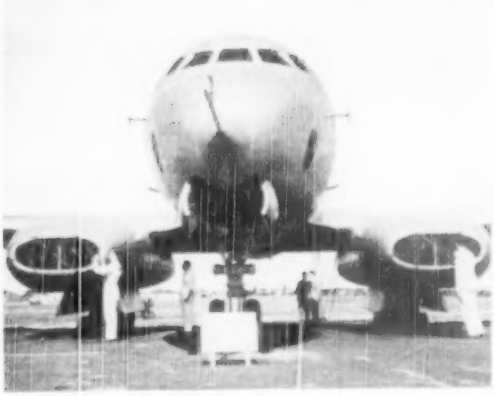




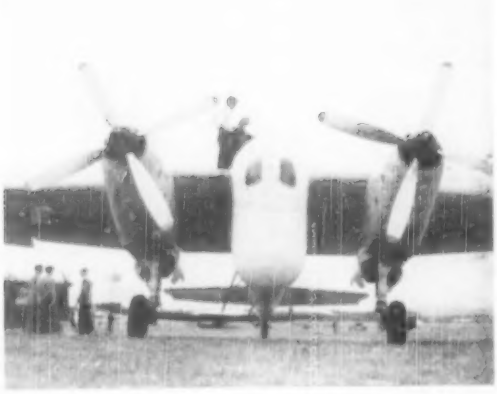
AVRO ASHTON 1 (above) shows numerous modifications over Tudor predecessors, including tricycle gear, squared-off vertical tail, new nose. The four R-R Nenes give a total of 20,000 lb. thrust.

BLACKBURN & GENERAL AIRCRAFT Universal Freighter (left). RAF's largest plane, features direct loading into fuselage via clam-shell doors at rear. Four Bristol Hercules engines give Freighter a cruising speed of 180 mph. at 12,500 ft. Gross weight is 105,000 lb., payload 32,256 lb.

DH 115 (right) is newest Vampire modification, a two-seat side-by-side dual control trainer for initiating types in jet piloting, navigation, gunnery, rocket sighting and fighter-bombing. Important modifications include redesign of nose and cockpit to allow sufficient room for carrying a student. Powerplant is a DH Goblin 3 of 3300 lb. static thrust. Gross weight is 11,303 lb.; top speed at sea level is 467 knots. The 115 is basically similar to the Mk. 5 fighter-bomber and can be adapted to operational use.



AVRO ASHTON 1's (above left) close, underslung mounting of R-R Nenes is pointed up in this front view of the research transport.



The SHORT S.B.3 (above right) anti-sub plane, powered by two AS Mamba turboprops, has been nicknamed "Dumbo."

Vickers Supermarine 535 Fighter Bows In

(McGraw-Hill World News)

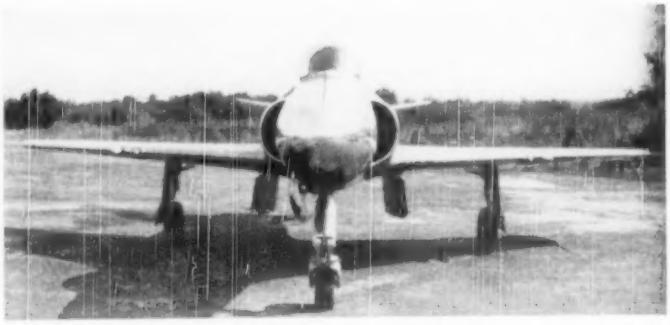
Farnborough—The shiny new Vickers Supermarine 535 displayed here publicly for the first time shortly after its first flight Aug. 23, points up the intensive development needed to produce a modern jet fighter.

Starting out with the Attacker, developed toward the end of World War II, then going on to the sweptwing 510, Supermarine engineers have now taken the best of the latter and built a full-fledged fighter claimed to incorporate a greater amount of sweepback than any contemporary British fighter.

The 535 is fitted with a Rolls-Royce Nene of 5000-lb. thrust equipped with afterburner, which should give the plane a very high Mach number.

An unusual feature of the new fighter is the use of a tail wheel in addition to its retractable tricycle main gear. The photo at the bottom of this page highlights the installation. Very large wing flaps are another noteworthy feature.

Dimensions are: span, 31 ft. 8½ in.; length, 42 ft. 11 in.; overall height 12 ft. 6 in., and wing area 295 sq. ft. Weight and performance figures are still classified. Armament apparently includes four 20-mm. cannon in the wings just outboard of the landing gear struts.



New Trend at Plug Conference

Maintenance in secondary role as Champion meeting stresses theoretical aspects of ignition problems.

By George L. Christian

Toledo—High engineering theory took center stage at Champion Spark Plug Co.'s 1950 ignition conference held here Sept. 5-7. Routine maintenance problems, hitherto the main attraction at these annual meetings, were relegated to the back row.

The trend was toward digging into basic fundamentals of ignition troubles—of disclosing, on a high technical plane, the latest inroads being made on the vexing problems of electrode erosion and fouling, of providing a glimpse into the future thinking of the men primarily concerned with the advancement of ignition performance and security.

The many discussions revealed that continuing use of ignition analyzers and thermocouple spark plugs, coupled with hard-headed thinking and keen investigation, are enabling engineers to knit together heretofore scattered and unrelated pieces of ignition data. Out of this they hope will soon emerge the achievement they seek: a fool-proof, maintenance-free ignition system and a spark plug that will consistently last a full engine change without removal.

▶ **Policy Problem**—Although some maintenance problems discussed, many engineers expressed the opinion that minor maintenance problems, such as cleaning plugs or testing them, were now well in hand and that the conference rightly should devote its prime efforts toward such technical considerations as:

- **Measurement of spark plug temperatures** while in operation.
- **How best to reduce** plug fouling to acceptable limits.
- **How to design** and construct a plug that would not be changed during the overhaul period of an engine.

Some airline maintenance representatives felt that many of the papers presented were too technical. "High theory is fine," they said. "But how do you apply it to getting schedules out on time." On the other hand, many were pleased with the technical plane of the conference and hoped that next year it would attract "some of the really long-haired boys" from the research labs and development centers of the nation's most advanced technical organizations.

Opinion was also divided concerning whether such a meeting properly should be sponsored by one manufacturer or whether it should come under the aegis of an organization such as the Air Transport Assn.

Carl Swanson and John Miller of Northwest Airlines offered one of the highlights of the conference. The study by these engineers on "How Large Can the Gaps Be?" was concerned with determining the maximum permissible spark plug gap that can be fired by voltages transmitted through the critical region of the plug, the plug barrel.

Space limitations imposed on plug design, plus the requirement of a connection to the cable, have held the voltage that can be transmitted to the spark gap to a value lower than that generated by current magnetos.

▶ **Gap Tests**—A series of tests was devised, starting with a correlation between engine power and plug "best launch" pressure. Matching sets of plugs with gaps ranging from .010 to .045 in. were used in conjunction with a Pratt & Whitney R-2800-CA15 engine equipped with water injection.

The final result of applying accumulated information was a family of curves (see cut) showing the largest allowable gap for various operating conditions.

Since the exact temperatures in the barrels was not known, curves for 100 and 150 C. were plotted.

▶ **Low Tension System**—Bendix Scintilla's Robert Boyer presented a paper entitled "Current Aircraft Engine Ignition Systems," actually an exposition of the advantages of the Scintilla-developed low tension ignition system recently purchased by American Airlines for installation on its entire stock of more than 400 P&W R-2800 engines (AVIATION WEEK Aug. 7). Among the advantages Boyer claimed:

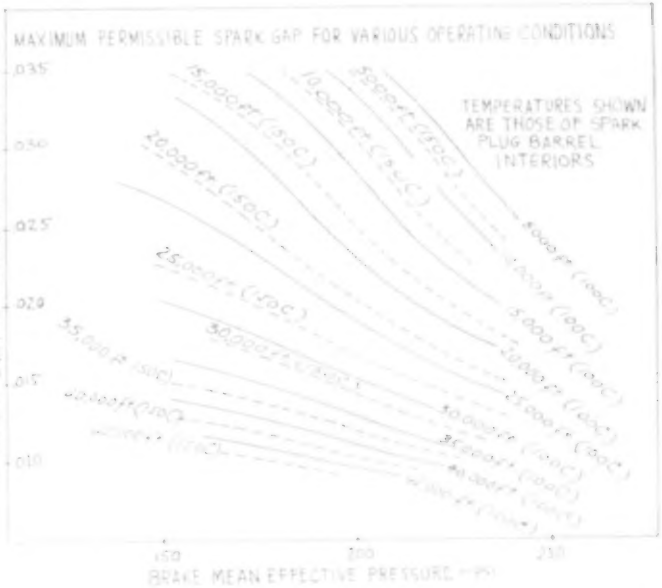
- **Electrode erosion rates** greatly reduced (.00145 in./100 hr. compared to .003-.005 in./100 hr. for high tension systems).
- **Reduction in unscheduled** plug removals and ignition delays.
- **Reduced "flashover"** difficulties at altitude and diminished corona effects.
- **Lower installation weight.**

Considerable discussion revolved around General Electric's recently announced decision to abandon the competitive high frequency system being evaluated by several airlines. Many urged that the project be revitalized.

▶ **Ignition Analyzers**—Sperry Gyroscope's J. W. Wherle talked on "Air Force Ignition Analyzers."

Some of the highlights of his paper:

- **On-the-job training** for personnel



using ignition analyzers is important.

- **Starting training** on a small engine saves money.
- **2500-hr. overhaul period** for the analyzer has been reached. Exceptions are the engine mounted units. These, Sperry says, may be expected to operate a full engine change.
- **Economic advantage.** First year saving per Constellation is $5111.
- **Saving of at least $9000** per aircraft in each subsequent year is expected.
- **Total installed weight** for a Constellation, including cable, is about 60 lb.
- **Airlines using** or contemplating the use of one or another type of analyzer are: PAA, Northeast, Sabena, EAL, NWA, TCA, AA, Continental.

PAA stated that it was so completely sold on the Sperry analyzer that it is giving top priority to the installation of such equipment on the AOA aircraft recently acquired as a result of the merger. It estimates that savings on the Boeing Stratocruiser will be double those realized on the Connie.

Major equipment malfunctions have been generator drive shaft shearing and loosening of the stator. Sperry says these problems are being eliminated. It added that efforts are being made to simplify the procedures for tuning the analyzer to the engine.

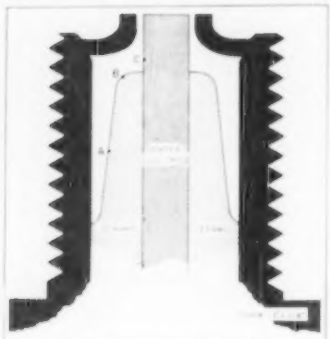
M. C. Fillmore of Sabena spoke favorably of the Scintilla ignition analyzer. He contended that on the ground it was just as satisfactory as the Sperry unit and cheaper to buy. N. K. Davis of UAL added that the Scintilla analyzer had been installed on a DC-4 in as little as 12 min.

J. E. Lindberg of PAA said that a Sperry unit can be installed in under an hour, adding that over 50% of the gains derived from an analyzer are achieved when used during flight. He stressed the great added safety factor derived from flight use of the ignition analyzer.

▶ **Plug Temperatures**—The extent to which engineers have probed for the basic operational data necessary to a complete solution of spark plug troubles was revealed by Champion's C. J. Eaton in a talk on plug temperature measurement.

Eaton and his colleagues have been trying for four years to obtain such measurements but have been handicapped by the technical difficulties of installing thermocouples at the plug tuning end and bringing off leads to register the temperatures, most important of which are readings at the center electrode and adjacent insulator portions since these control erosion rate and fouling susceptibility.

On R-3350-1 plugs thermocouples were applied as illustrated, except that they were placed on the insulator nose 1/4, 3/8, and 5/8 in. from the tip, and 5/8 in. from the end of the center electrode. Only two could be used at once, other readings being easily predictable.



Some observations:

- **Temperature curves** were consistent when conditions were repeated.
- **Temperatures vary** considerably for different engine operating conditions (take-off, take-off) but charted recordings stay in the same order, practically parallel.
- **Reference point** is the insulator nose, hottest part of the plug and most likely to cause pre-ignition.
- **Pre-ignition may be expected** at plug temperatures exceeding 1600 F. (A Stanford and oil of California representative [illegible] 1700 F. as the boiler explosion.)

Some pertinent temperatures obtained with the thermocouple plug:

- **Variation in IMEP** from 300 to 250 brought about changes: insulator nose, from 1493 to 1508 F.; central electrode, from 1000 to 1144 F.
- **Use of a pure nickel** instead of nickel-and-copper center electrode caused marked increase in temperature at 150 IMEP: insulator nose, from 1508 to 1490 F.; center electrode, from 1000 to 1248 F.
- **Large temperature reductions** obtained with a special high-conductivity ceramic insulator. Results at 150 IMEP: insulator nose decreased from 1508 to 510 F. and center electrode from 1000 to 810 F.
- **Temperature distribution** on insulator nose at 150 IMEP: nose, 1493 F.; 1/4 in., 1508 F.; 3/8 in., 1428 F.; 5/8 in., 1210 F. Note large gradient.
- **When a standard** and a thermocouple plug were installed in the same cylinder and the former was not hot, temperature of the thermocouple plug dropped 80 F. When the cylinder was cool and the standard performed to fire, temperature of the thermocouple plug dropped 380 F.
- **Effect of detonation** on plug temperature: no knock, 1000 F.; slight knock, 1[illegible] F.; heavy knock, 1190 F.

Eaton considers the science of measuring spark plug temperatures is in its infancy, and feels that tests on all plug types have been too few. He told AVIATION WEEK that Champion has not had time to decide how to use all the vast mass of data it has accumulated.

▶ **Fouling**—He saw lead fouling as the most important spark plug problem and design as the most likely solution. Here an important factor is configuration of the ceramic with relation to shell clearance volume and operating temperatures. Continuing studies by plug engineers, with those by petroleum researchers, engine manufacturers and aircraft operators, Eaton believes, will bring a substantial reduction in plug fouling.

▶ **Secondary Condensers**—Pre-firing on R-2800 engines was analyzed by Paul Kovac, senior ignition engineer for American Airlines, in a discussion of "Effects of the R-2800 Secondary Condensers as Observed on the Ignition Analyzer." The analyzers indicated, Kovac said, that the engines were experiencing an electrical discharge likely to fire a cylinder "some time" before breaker points opened.

"This pre-fire," he asserted, "is apparently caused by the residual voltage left on the series condenser of the magneto. This early gap breakdown is at times causing a power increase while the series condenser is used and when the ignition performance is better than average."

He concluded that increased spark plug gaps or series and shunt resistances would lessen pre-activity to a point where no pre-fire would be noted on the scope screen.

His contention that the R-2800 lost about 55 hp. with the secondary condenser removed was questioned by John Ferrare, PAW's assistant technical superintendent, who thought the loss was more like 40 hp.

▶ **New Cable**—Interest was expressed in a report by L. P. Larson, Northwest Airlines powerplant engineer, on a service test of AC NCP-63 high resistance ignition cable in a high tension ignition harness for a PAW R-2000-2SD13-G engine.

The cable, special impregnated strands of Nylon 7 mm. in diameter, is covered with conventional looking cable insulation and has a 4000 ohm/ft. resistance.

In NWA's test, 28 new Champion R-37S-1 plugs were used, the gaps held as closely as possible to .012 in. Leads to the Nylon ignition cable were run to plugs in cylinders 6, 7, 9 and 10. No ignition system malfunctioning was reported in the pilot's log book for the 513 hours that the plugs were operated.

Average erosion rates per 100 hr. for front and rear plugs fired by the conventional harness for the 513 hr. were .00324. Corresponding figure for plugs fired by the high resistance cable was .00121, or a reduction in erosion rate per 100 hr. of about 40 percent.

NWA concluded that with the use of the new cable, erosion rates of high tension ignition systems could be made comparable to those obtained with low tension systems.

▶ **Temperature Predictor**—Champion's "thermoelectrometer" drew great interest.

Purpose of the device is to predict insulator nose and center electrode temperatures under the seven variable engine operating conditions: Fuel/air ratio, cylinder head and inlet air temperatures, mark advance, rpm., manifold pressure, exhaust back pressure.

NEW AVIATION PRODUCTS

Prop Wrench Gives Exact Torque

Precision tightening is made easy by new Kell-Strom assembly designed by Curtiss-Wright, Ham Standard.

A unique propeller torque wrench and hoist assembly, designed to replace torque bars and prop slings now commonly used, is being produced by the Kell-Strom Tool Co., Hartford, Conn.

With this equipment, say those who make it and use it, prop retaining nuts—and engine thrust nuts with special attachments—can be tightened to the exact torques specified. And props can be hoisted and adjusted to virtually any tilt angle or point of rotation desired and fitted to the shaft with precision.

The guesswork at bar tightening and the damage to prop cuffs and dewer elements caused by slings are eliminated. The wrench minimizes the chances of shafts cracking from vibration of loose props, improperly secured by retaining nuts.

While a precision device such as this obviously costs more than a simple torque bar and sling, the manufacturer points out that the time and expense involved in replacing a single broken propeller shaft probably costs still more.

▶ **Send-off**—The new prop has arrived on the market with a gold plated introduction. It has been quickly approved by the Propeller division of Curtiss-Wright Corp. and the Hamilton Standard division of United Aircraft Corp. to use with every small prop produced by those firms. Incremental attachments adapt the wrench to the various models.

Curtiss and Ham Standard designed the new wrench themselves. Kell-Strom, with no manufacturing rights, sailed on casting "nuts" before it went into production.

The wrench assembly is detailed with another set of attachments to adapt it to propellers produced by Aeronautic division of General Motors Corp.

Essentially, the experimental complete wrench and gage assembly anchored to the floor of the prop project is removed of the attachment. One man at the engine station can install or remove the prop, place with the proper bar tightening jacked, two men after hoisting at the end of the bar, while another pulls on the prop blade.

Kell-Strom's sales manager, Arthur W. Erickson, has the Air Force and Navy have placed the biggest orders for the equipment to date.

▶ **Users**—Others using the wrench, according to Erik, are Trans World Airlines, Northwest Airlines, Fairchild Engine & Airplane Corp., Pratt & Whitney division of United Aircraft, Boeing Airplane Co. and, of course, the designer themselves.

Erik points out that the wrench is not primarily designed as quick-change equipment and to do the job on a plane. However, he feels it will save time in removing, thereby eliminating nuts.

▶ **Demonstration**—Erik, since demonstrated to airline personnel just how it works, a torque bar can be. While it sometimes took six men to lock one prop, he can get retaining nuts on a 1000 engine in minutes. The nuts are supposed to be tightened at 1000 ft. lb. and will take this 400 ft. lb. 470 ft. lb. 1200 ft. lb. He defies Rolex checking the bolt and. Erik points out it is "amazing or shocking" difficult to turn such with a bar the high torque required on large prop coming into use.

The Kell-Strom torque at the prop shaft end. A long socket wrench Drive Link and gear unit is attached on the front end to engage the nut retaining nut. Wrenches have on the wrench permit movement of the prop on which rotation from the side of the wrench, left and right, or bottom. The hoist operated by hand, mounted with the gear unit, is at the end of the bar opposite the wrench to hoist the wrench.

The connection is made to the prop by means of a three-point fixture which fits over the prop blade on the face of prop where the blade meets the hub. It is a special fixture, not a standard fixture, 1000.

Attached in this manner, the prop can be lifted by means of the arc-shaped trolley. The eye at the top, designed to accommodate a loading chain hook, can be moved to any position along the curved trolley track and locked, tilting the prop at the angle desired to line it up with the axis of shaft on the engine. This also permits the prop to be taken off the engine in a vertical position and tilted to an intermediate or horizontal position for placement on a dolly.

▶ **Free Prop Rotation**—Further, the wrench assembly is free to rotate within the collar (center) which secures it to the trolley. Thus, the suspended prop, anchored to the wrench, can be rotated to the position desired to line it up accurately with the splines on the shaft. This feature also is useful in lifting a prop from the dolly. A three bladed prop, resting on the dolly in an inverted "Y" position, can be picked up, then quickly rotated to an upright "Y" position for installation on the engine.

Engineers chiefly responsible for the development of the device are Cliff Osterling and John Kaden of Hamilton Standard and Wilson D. Nagle of Curtiss Wright Corp.

Better Diaphragms

Reconditioning a synthetic fiber developed by du Pont with one of its synthetic rubber products, Connecticut Hard Rubber Co., New Haven, has developed what it believes is one of the best diaphragm materials for aircraft components including carburetors and the similar.

It's called "Cohlastic" 1500 and is made of du Pont "Orlon" fabric coated with "Cohlastic" silicone rubber, made by the New Haven company.

Some qualities recommending use of the new diaphragm material in aircraft parts are, according to the firm, extreme flexibility, long flex life, quick response when pressure differentials are low, and favorable resistance to effects of high and low temperatures. It can be used from −75 to 400 F. and higher. Other distinguishing points, its impermeability, good radiation strength, high tensile strength and light weight, the firm says.

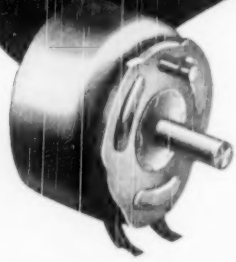
"Cohlastic" 1500 has about the same temperature resistance as silicone rubber coated Fiberglas made by the company, but is more flexible and better withstands constant flexing, J. A. McLain, the firm's president, told Aviation Week.

Diaphragms may be flat or convoluted. The material is supplied as a fabric in thicknesses of .010 and .017 in. or .0 in. the form of finished diaphragms.

It is not suitable for use in aircraft exteriors because silicone rubber is affected by ozone. Address: 407 Lock St., New Haven 9, Conn.

LEDEX

ROTARY SOLENOID



SOLVES MANY REMOTE CONTROL PROBLEMS

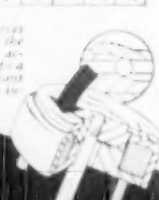
The many production applications of Ledex Rotary Solenoids vary from the dependable, snap-action tripping of airborne bomb releases to the actuation of rugged, hydraulic valves in heavy duty materials handling equipment.

Five Ledex Rotary Solenoid models are manufactured. Diameters range from 1 1/8 to 3 3/8 inches. Predetermined rotation up to 95° can be engineered to suit your product's requirements. Starting torques for 45° stroke range from 1/4 pound-inches to 50 pound-inches.

We supply to quantity users and solicit the opportunity to be of assistance in engineering a Ledex Rotary Solenoid to meet your product's requirements.

Model No.	2	5	6	7	8
Diameter	1 1/8"	1 7/8"	2 1/4"	2 7/8"	3 3/8"
Torque lb./inches	1/4	5	10	21	50
Weight lbs.	3/8	1/2	1	2 1/4	4 5/8

Magnetic action moves the armature along the solenoid axis. This action is converted into a rotary motion by means of ball bearings on inclined tracks.



WRITE DIRECT TO

G. H. Leland INC.

105 WEBSTER STREET

DAYTON 2, OHIO

Tape Records Tower Talk

Another magnetic tape recorder permitting play-back of conversations between airport control towers and aircraft is being displayed on the equipment counter. It is the Model 550 B Magnamaster, produced by the Amplifier Corp. of America.

The Magnamaster is a versatile machine. It will continuously record plane-tower talk on a single channel for 24 hours. If a voice-activated circuit is used to control the instrument, and the channel is used only part of the time, the unit will record proportionately longer without a tape change. It can be modified to take down conversation on two channels for 12 hours, or four channels for 6 hours.

A partially recorded reel may be played back immediately without interruption of the recording process, the firm says. And a cueing device, in connection with a time chart, speeds the search for conversation made during any part of the 24-hour period. The maker claims the tape may be played thousands of times without deterioration. Conversation is erased automatically from used tape as a new recording is being made.

► **Flexible Unit**—The maker feels a single Magnamaster, with selection of single to four-channel coverage, would be particularly suitable for small airports. The 200 lb. machine takes up a floor area of about 2x1½ ft. and fits in a room with a 7-ft. ceiling. It costs $1250. Three Magnamasters, costing $4650 (including $600 for modifications) could be used to record on 12 channels over a 6-hour period at large airports.

The unit consists of a jack housing two separate recording plug-in units. Each recording system operates for 12 hours at a tape speed of 4 in. sec. A 15 in. diameter reel in each system carries 4800 ft. of standard 1-mil recording tape. Since the tape has two tracks, the reel turns in one direction for 6 hours on one track, then reverses and records on the other track.

After both tracks on the tape have been run a total of 12 hours, a relay starts the second recording system on an identical cycle, giving a total of 24 hours of continuous recording without a reel change. Continuous operation for longer periods is achieved simply by changing the first reel while the second reel is running.

To cover two channels for 12 hours, both recording systems are used simultaneously. Four-channel coverage for 6 hours is obtained by using both tracks on each tape of the two recording systems at the same time.

► **Voice-Activated**—If desired, the company will add a voice-activated circuit to control operation of the instrument in the sound of a voice or other signal. This circuit is designed to start tape feed within 0.1 second after the signal and to stop it 5 seconds after sound has ceased.

The company has been producing amplifier and radio equipment since 1934, according to Sidney Karr, sales manager. Karr says the company's chief engineer, Nathan W. Haynes, designed and built the first magnetic recording amplifier in the U. S. in 1937.

Records Movement

A system which utilizes a slit type camera to record and measure velocity and acceleration on a single strip of film of objects moving faster than 2000 mph., has been developed by Beckman & Whitley Inc., 900 San Carlos Ave., San Carlos, Calif.

Besides recording and measuring velocity and acceleration of such high-speed objects as guided missiles and projectiles, the equipment can be used for recording oscillograph traces and other oscillations taking place vertically within the slit plane.

The firm says the equipment, known as the Temporal Sequence System, permits optical and non-optical events to be plotted with equal facility over as long a time period as desired. Besides the 600 lb. camera, the system includes a 100 lb. power unit and a 60 lb. timer-control mechanism.

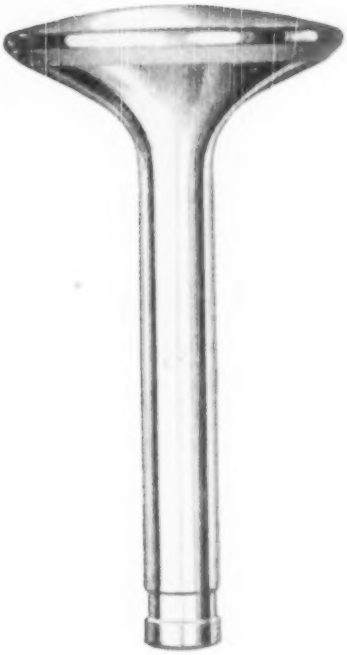
Adjustable film speed in either direction permits recording of events progressing in either direction across the vertical slit of the camera. The results look like a conventional step-action photograph of two-dimensional space.

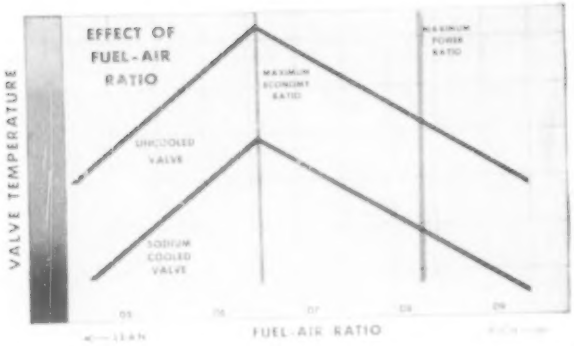
For non-optical events, electrical pulses can be fed to the system and recorded on the film in significant relation to the time markings on the film.

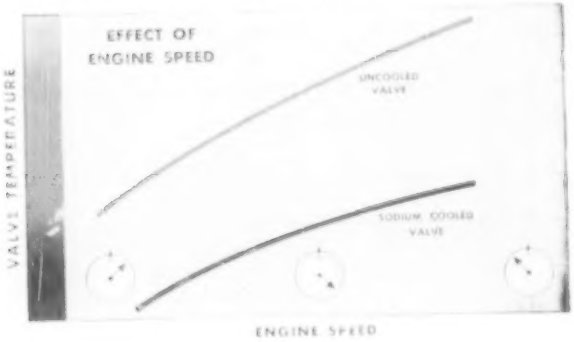
Why Sodium Cooled Valves?

The trend of modern engines is to operate at higher speed and more economical fuel-air ratio. In considering factors which influence exhaust valve life, temperature is the dominant one. High temperatures sharply reduce the resistance to corrosion, distortion, and fatigue life of the finest alloy steel. The effectiveness of sodium cooling in reducing valve temperatures is shown by the curves below, which are typical of recorded test data.

The curve "Effect of Fuel-Air Ratio" shows that as the mixture is leaned out to obtain maximum economy, valve temperatures rise. The curve showing "Effect of Engine Speed" indicates that temperature rises quite rapidly as speed increases.







EATON
MANUFACTURING COMPANY
General Offices CLEVELAND, OHIO

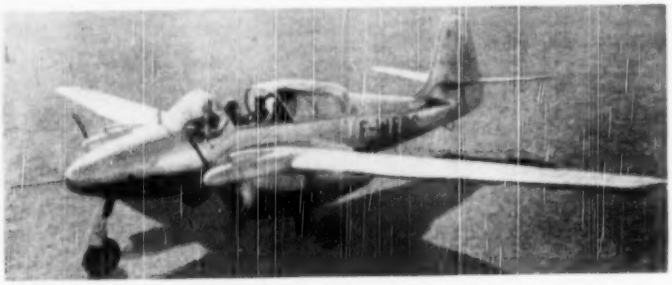
Eaton engineers will welcome an opportunity to discuss the application of Eaton sodium cooled valves to engines proposed or now in design.

VALVE DIVISION • 9771 FRENCH ROAD • DETROIT 13, MICHIGAN

SIPA S 901: Light trainer-touring plane powered by 75-hp. Minie engine. Construction is plywood and fabric. Top speed is 124 mph.

BREGUET 900: Sleek sailplane has tip installations to prevent wing damage, units also probably serving to give end plate effect.

French Private Firms Speed Comeback



MORANE-SAULNIER MS 700: Four-seat colonial liaison transport also serves as ambulance, light freighter, trainer. Top speed at 4920 ft. is 180 mph. Gross is 4885 lb.

DASSAULT MD 315: Military transport, colonial liaison craft has two 600-hp. Renault engines with reverse pitch props. Gross is 13,200 lb., span about 68 ft., length 40 ft.

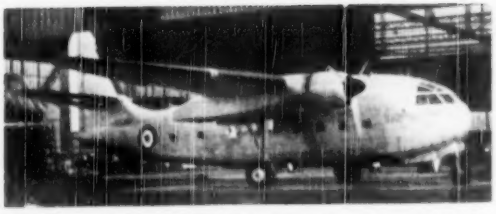
Latest information on production activities of French privately owned aircraft companies reveal that postwar emphasis has been mainly on gliders, trainers, and touring types.

And these private enterprises, considering the difficulties that have beset French postwar industries, continue to show good progress. Last year, 19 first flights were made with a wide variety of craft built by 17 companies. These planes include fighter, transport and cargo types in addition to glider, trainer and touring craft. And between January and July, this year, eight diversified types of planes by private companies were flown for the first time.

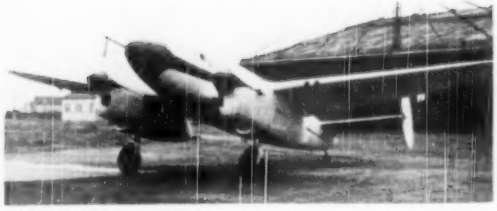
This record betters that achieved by French nationalized companies in the same periods. Seventeen first flown in 1949 and three as of July this year.

The accompanying tabulation lists the production units of these 17 private French aircraft constructors.

This detailed information, supplemented by data on the activities of the French nationalized companies, which appeared in the Aug. 28 issue of AVIATION WEEK, gives a comprehensive picture of the type, flight status, and production plans for France's wide variety of aircraft.



BREGUET 891 R: This military cargo, transport prototype has box-shaped middle fuselage section. Cruising speed is 186 mph.



REY 01: This experimental craft exhibits very clean lines and noteworthy nacelle cowling job. Craft's empennage is unusually wide.

Aircraft Production of French Private Companies

AIRCRAFT	FIRST FLIGHT	TYPE	PRODUCTION
DASSAULT			
MD-315 Flamant	4-15-1947	Transport (military)	3 prototypes; 200 in production
MD-450 Ouragan*	2-28-1949	Interceptor	3 prototypes; prod. planned
MORANE-SAULNIER			
MS 475	2-2-1945	Advanced trainer	Only 1 built
MS 476	12-20-1945	Advanced trainer	1 prototype; 200 built
MS 474	7-27-1947	Advanced trainer (recast)	1 prototype; 50 built
MS 472	4-1-1947	Advanced trainer	1 prototype; 200 built
MS 477		Advanced trainer	1 prototype under development; prod. planned
MS 500	9-1-1947	Great advanced trainer	Only 1 built
MS 502	1-1-1948	Great advanced trainer	Only 1 built
MS 370	12-10-1945	Great touring	Only 1 built
MS 372	2-10-1947	Great touring	1 prototype; 2 built
MS 373	7-28-1947	Great touring	1 prototype; 2 built
MS 375	6-3-1947	Great touring	Only 1 built
MS 400		Great touring	1 prototype under development; prod. planned
MS 405-4		Great touring	1 prototype under development; prod. planned
MS 460-61	2-1-1946	Great touring	Only 2 built
MS 200	1-8-1948	Transport	Only 1 built
MS 230	8-1-1947	Transport	1 prototype; prod. planned
MS 250-4	8-11-1949	Transport	1 prototype; prod. planned
MS 270-71	8-11-1949	Great advanced trainer	1 prototype; prod. planned
MS 272		Great advanced trainer	1 prototype under development; prod. planned
SECAN			
(Société d'Etudes et de Construction Aero Navales)			
SECAN 10 Cadet	1-5-1948	Light touring	2 prototypes; 1 built
BOISAVIA			
Alouette	Dec. 1946	Touring	1 prototype
Mercure	1-1-1948	Tourist	1 prototype; 11 under construction; prod. planned
FOUGA			
CM-Jaico	1-1-1946	Training glider	
CM-9	1-10-1948	Training glider	
CM-7	1-10-1948	Training glider	
CM-8	1-10-1948	Training glider	
CM-8 R-10 Sylphe*	2-15-1949	Acrobatic glider	1 prototype
CM-8 R-13	2-15-1949	Experimental glider	1 prototype; prod. planned
CM-8 R-15	6-4-1949	Performance glider	1 prototype; prod. planned
CM-8 R-15 Pyrenee	2-5-1949	Acrobatic glider	1 prototype
CM-10	8-1-1947	Training glider	1 prototype (one destroyed)
CM-200	1-18-1948	Training glider	1 prototype; prod. planned
CM-170-R Cougar	7-21-1948	Primary trainer	1 prototype (R-21 built)
CM-191		Advanced trainer glider	Built (CM-191 KV-AVIAT)
CM-301 R	1-1-1949	Advanced trainer glider	1 built
CM-211 R	1-1-1949	Advanced trainer glider	1 built
CM-211 T	1-1-1949	Advanced trainer glider	1 built
LA GARDE			
MG-1	12-24-1949	Experimental	1 prototype
LIGNEL			
L-14	12-15-1949	Touring	1 prototype (Trans-Pacific)
L-15	2-15-1947	Touring	1 prototype
REY-MATRA			
Rey-01	12-[illegible]-1949	Experimental	[illegible]

* Jet-powered plane. Number of aircraft indicates number to date.

AIRCRAFT	FIRST FLIGHT	TYPE	PRODUCTION
BREGUET			
Bregnet 482	11-28-1947	Bomber	1 prototype (not flight tested)
Bregnet 100 Colmar	2-27-1945	Transport	Only 1 built
Bregnet 250, 251	12-20-1944	Patrol (navy)	2 in service
Bregnet 761, 765	2-12-1948	Cargo	1 prototype; 3 built; 12 in prod.
Bregnet 890 Mercure	1-5-1950	Cargo	1 prototype; prod. planned
Bregnet 891 R Mars	11-16-1949	Cargo (military)	1 prototype; prod. planned
Bregnet 892 Mercure	7-11-1948	Cargo	1 prototype
Bregnet 784	2-15-1949	Submarine hunter	1 prototype; prod. planned
Bregnet 960*		Naval strike fighter	2 prototypes under development; prod. planned
Bregnet 11 R, 111	9-21-1949	Helicopter	2 prototypes; prod. planned
Bregnet 960		Performance glider	2 prototypes; prod. of 10 planned
LEDUC			
Leduc 010*	10-11-1947	Experimental jetplane	2 prototypes; 3rd under development
GUERCHAIS-ROCHE			
[illegible]	3-1-1944	Touring	1 prototype; 16 built
[illegible]	1-1-1946	Tourist	1 prototype; 9 built
[illegible]	1947	Advanced training glider	Six built
SIPA			
(Société Industrielle pour l'Aéronautique)			
S-11	12-26-1944	Advanced trainer	1 prototype; 70 built
S-11 (and 12)	2-4-1945	Advanced trainer	1 prototype; 16 and 54 built, respectively
S-20	2-12-1948	Advanced trainer	1 prototype; prod. of 10 planned
S-90 and 91	8-15-1947	Light trainer	1 prototype; 16 built
S-91 and 92	4-27-1948	Training touring	2 prototypes; production of 100
HUREL-DUBOIS			
HD-31	4-22-1949	Experimental	1 prototype
SCAN			
(Société de Construction Aero Navales de Paris-Ouest)			
SCAN 30		Acrobatic trainer	1 prototype; 25 built
SCAN 35		Acrobatic trainer	1 prototype; 35 built
		S-Agrin under trainer	
MAX HOLSTE			
MH 32	1-12-1946	Primary trainer	1 prototype; 18 built
MH 34	7-1-1948	Primary trainer	1 prototype; prod. planned
MH 152		Glider	1 prototype under development; prod. planned
CAMPAGNIE FRANÇAISE d'AVIATION			
Farman Major	8-1948	Light touring	10 built
C.F.A. Major	1-1949	Light trainer	10 built
Joint prototypes	8-1[illegible]	Light touring	1 prototype
Transport	8-1950	Light trainer	1 prototype
STARCK			
AS-1	1-1-1949	Training touring	1 prototype; 11 built
AS-2 (-3)	1-1-1949	Training sport	1 prototype; 11 built
AS-4	1-12-1950	Primary trainer-sport	1 prototype; 3 built; prod. [illegible]
Star-Lark	1-11-1950	Tourist-sport	1 prototype; prod. planned

Announcing

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AF Streamlines Jet Overhaul

Jet engine overhaul for the Air Force already has graduated into the big scale "production line" stage. The procedure at Oklahoma City's Tinker AFB may well be the pattern for commercial overhaul activities which jet transports will be flying for, in time.

Tinker, which takes in powerplants from all USAF jet craft, is pushing out an average of 350 overhauled thrust engines per month, after just a little more than three years of operations. In May, 1947, the first month of its operations, 42 were overhauled.

► **Overhaul Cost**—Tinker's activities not only are paying off by speedily getting jets back into fighting planes, but from an economic angle as well. Cost of overhauling a $45,000 turbojet is reported to be only about $2,000. And the reliability of the overhauled units is evidenced by a J35-11 engine that was reconditioned during the first month of Tinker's operations.

This jet was returned after 1,74 hours of flight time, overhauled again, and is still in service. While this concession is not startling, it must be remembered that the jet and its overhaul procedure still are comparatively new.

► **Procedure**—Here are some of the highlights of Tinker's overhaul procedure.

First, the engine is stripped of all accessories, some 400 having to units so 100 items included in the category. Each unit is tagged and routed for cleaning, repair, and testing.

A table was shown for time, the engine is separated into its components. Because the process of actual reassembly is completed, each overhauled component finds its way back into the specific engine of which it was a part.

Ferrous and non-ferrous components go through separate cleaning routines, after each is checked for cracks and flaws. Magnaflux is used for ferrous materials. Zyglo for the non-ferrous. Internal inspections are made with the Spectro Reflectoscope.

► **Checking**—Rotors are proved in a 21 layer armor plate spin pit. 1.5% are spun pit checked at 15,000 rpm, 1.7% at 8800, 1.4% at 9100 rpm.

After reassembly, the engine goes to the test cell and checks are made of ambient air, compressor and tailpipe temperature, specific fuel consumption at various rpm, and thrust values. The turbine wheel is rechecked for cracks and flaws. A corrosion preventive oil also is run through the engine.

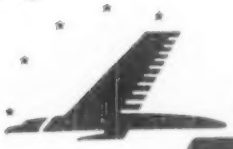
Overhaul time per engine runs between 500-400 man-hours. Testing consumes a good portion of this. Thus, fuel control overhaul takes about 14 man-hours, test procedure takes another five.

1934

LOCKHEED'S SWIFT ELECTRA
was built of Alcoa Aluminum

16 years ago you could see the "look of the future" in the distinctive Electra airliners introduced by Lockheed Aircraft Corp. Fastest commercial transport of its day . . . one of the first to have a complete skin of alclad aluminum alloy. It was virtually all-Alcoa Aluminum from its twin rudders to its twin Pratt & Whitney engines. The original Electra is still flying.

1950

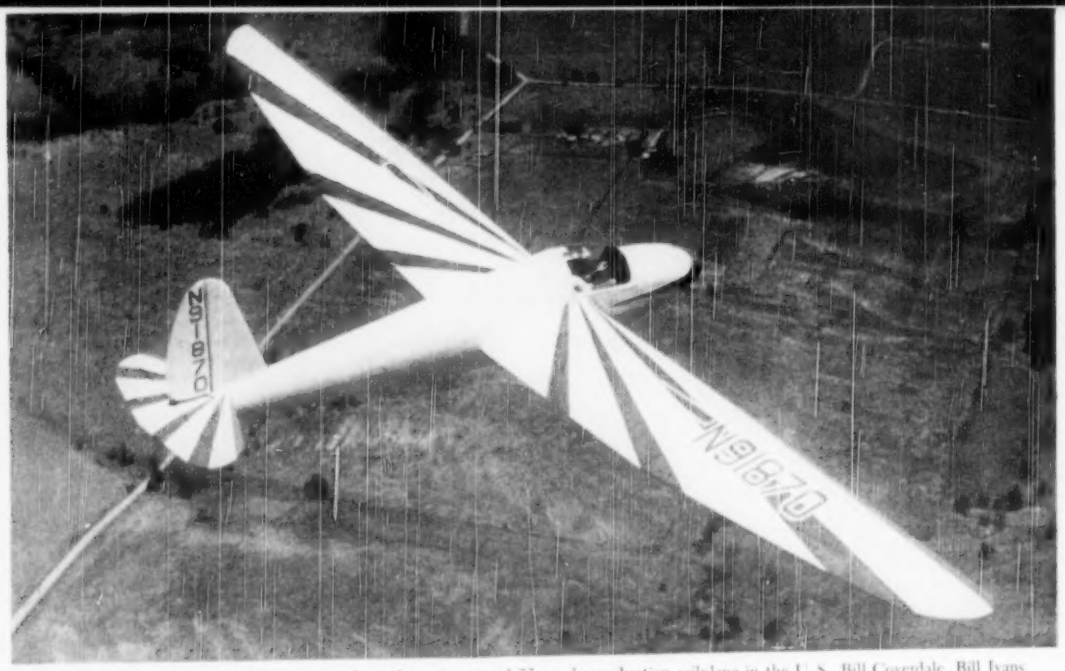


ALCOA ALUMINUM *FLIES WITH* Capital Constellations AIRLINES

Air travel has come a long way from the days of the Electra to today's luxury cruising in Capital Airlines great, new fleet of Constellations. We salute these high-performance ships . . . the Capital men who fly them . . . the Lockheed craftsmen who build them. It's a transportation team that's sure to click with the flying public.

Look to Alcoa as your "Flight-metal Headquarters." ALUMINUM COMPANY OF AMERICA, 1800J Gulf Bldg., Pittsburgh 19, Pennsylvania.

ALCOA ALUMINUM MAGNESIUM



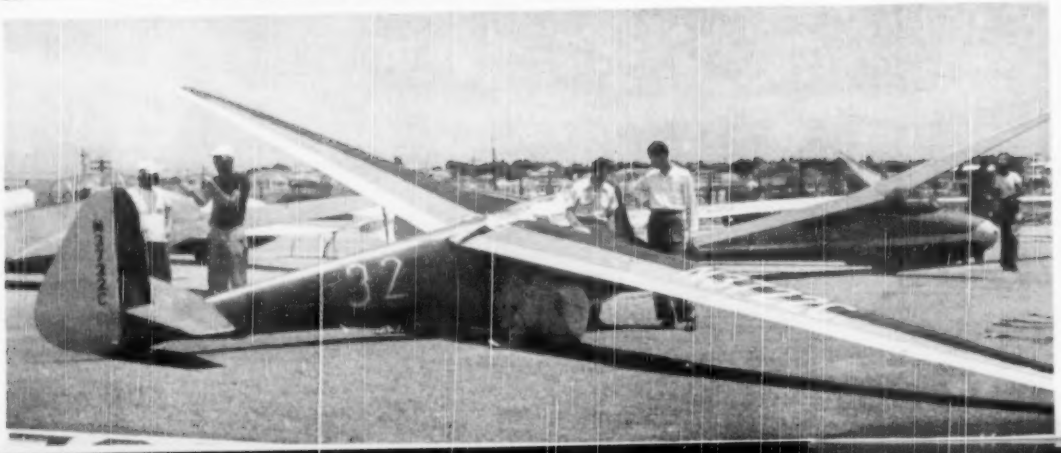
SCHWEIZER 1-23 Nine of a total of 41 entries were 1-23s, only production sailplane in the U. S. Bill Coverdale, Bill Ivans and F. J. Reeves placed 2nd, 3rd and 4th, respectively in the meet, all flying this popular craft.

PRATT-READ

This redesigned two-placer, dubbed a "flat-top," has conventional canopy sliced off, replaced by double bubble. Craft won meet's Class B championship. Sailplane was originally built for Navy as a trainer.

RJ-5

This sailplane was winner of contest. It was designed by Harlan Row and Dick Johnson, flown by latter. His best performance was 337-mi. goal flight to exceed national goal, distance records. Wing is laminar flow.

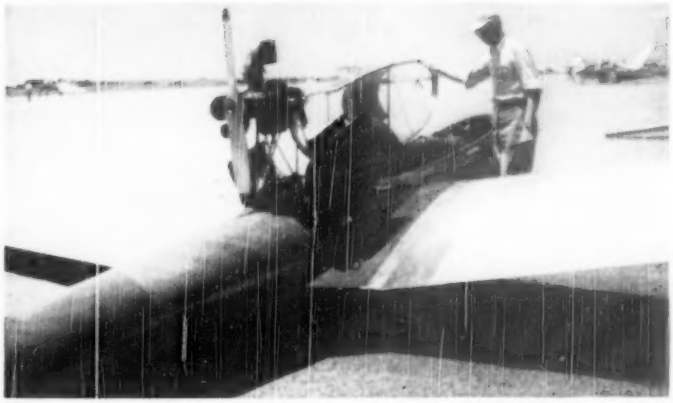


FARRAR ALL-WING Frank Farrar's small-span experimental sailplane was exhibited but not flown at meet. Large tips are controls. Entry to craft is at rear (tail moved aside) and pilot lies prone, strapped in position.

Latest Gliders Gather for Meet

The recent Seventeenth National Soaring Contest at Dallas' Grand Prairie Airport put the spotlight on new design trends in sailplanes, indicating to expert observers that the U. S. has taken the lead in developing new efficient designs and promoting the soaring art.

In the exclusive pictures here and on page 52 AVIATION WEEK shows some of the more outstanding designs exhibited and flown at the meet.

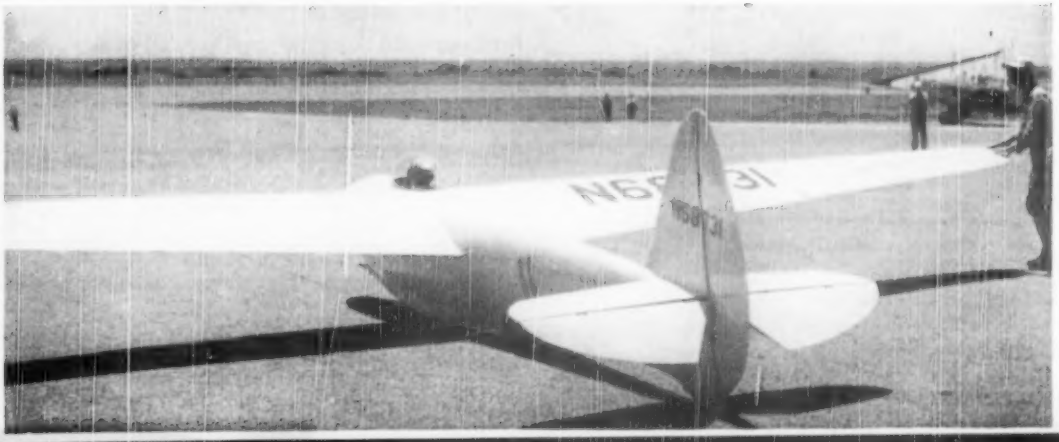


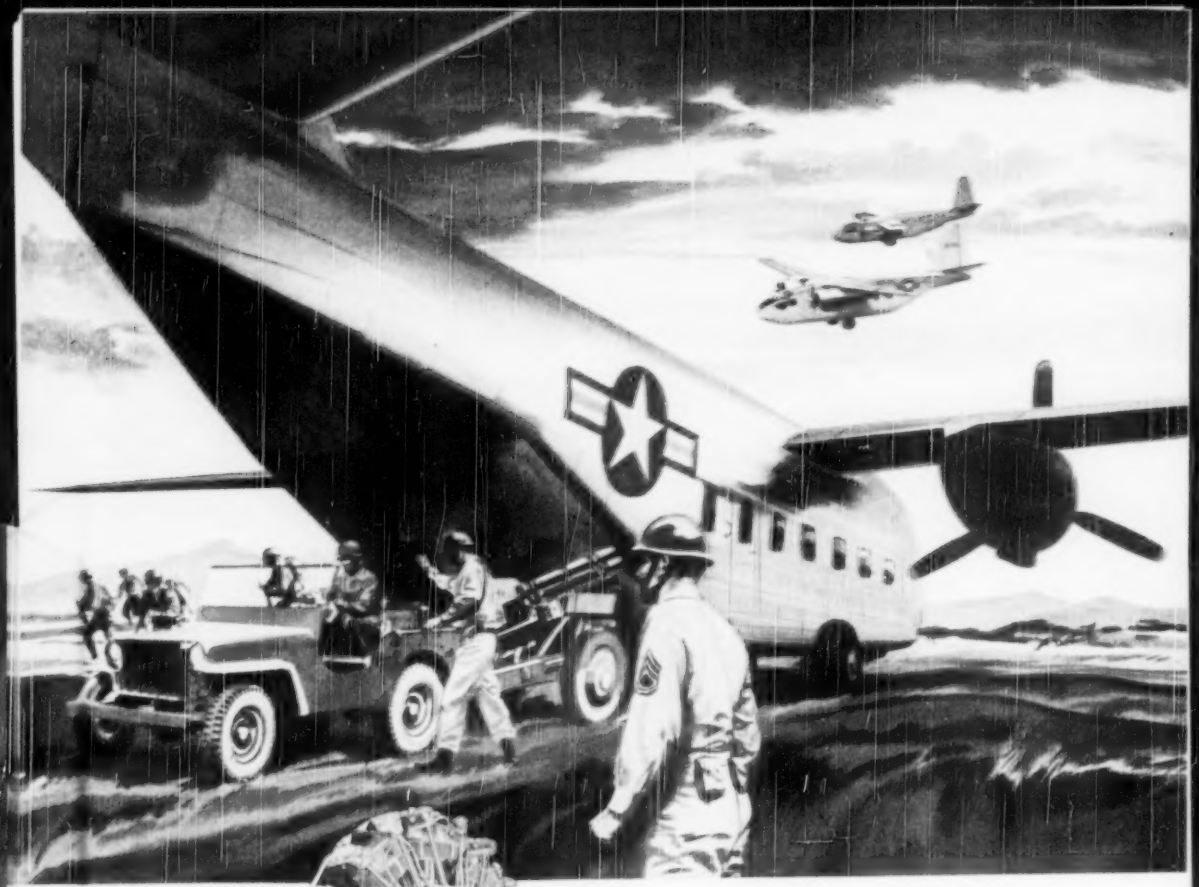
HUMMINGBIRD

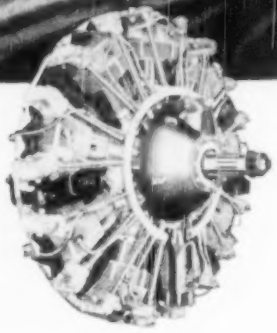
Ted Nelson's powered glider has 40 lb., 4-cyl., 40 hp. engine, fully retractable and covered by aerodynamic canopy contour for soaring flight.

TINY MITE

Sleek, small-span sailplane was flown for first time this year. Bubble just covers pilot's head. Construction is plywood.







POWER PLANT FOR THE FREIGHTER—Two Wright Cyclone 9's—rated at 1475 hp.—provide the Chase Avitruc with high power for short take-offs—low weight for increased payload—their ability for greater utilization.

Freighter...

The versatile family of service-proved Wright Cyclone engines powers each of these widely different aircraft with an engine ideally suited to its needs:

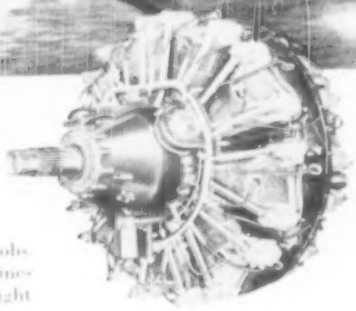
▶ **The Chase C-122 Avitruc**—Air Force assault transport—takes off from and lands on short unimproved fields, must load and unload fast, and deliver troops and equipment in effective numbers.

▶ **The Douglas AD Skyraider**—new Navy "Airborne Arsenal"—flies up to 10,000 lbs. of bombs and rockets at 500 miles an hour; is versatile, rugged, famous for long-range capabilities.

Lockheed P2V-4 Neptune

Piasecki H-21 Rescuer

Martin P5M Marlin



POWER PLANT FOR THE FIGHTER — For the Douglas attack bomber, a single Wright Cyclone 18 delivers 2700 hp. for take-off . . . is designed and built to provide exceptional take-off, climb and range performance for carrier aircraft.

OR Fighter

▸ The six aircraft shown below do other important jobs. Each has its own special power needs, and Wright engines power them all. The future will bring new needs, and Wright engineering and production teams are ready to handle them.

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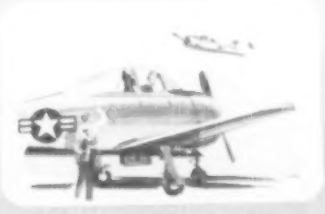
Northrop C125 Raider

North American T-28 Trainer



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SUPERIOR RADIO WORK

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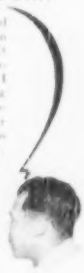
EARL DAHL



Pilot of the Navy Beech craft 2181 operated by Kyle Motting Co. of Montgomery, Mississippi, Earl Dahl needs and recognizes the best in executive aircraft radio equipment. As a veteran other experience Pilots have been doing for almost two decades, Dahl turns to Southwest Airmotive.

Radio panel in Kyle Motting Co. Beech, showing how a considerable amount of equipment has been worked into a relatively small space. Note room for expansion of frequencies on glide path and dual audio utilizing 3-21 isolation amplifier. Panel is plug-in type. Pilot Dahl received complete wiring diagram at time of radio completion.

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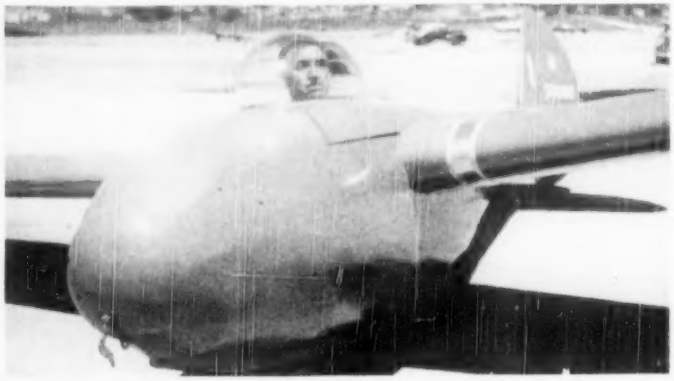
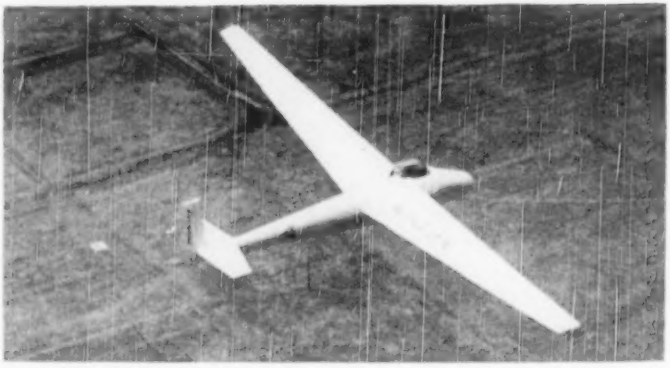
SOUTHWEST AIRMOTIVE CO.

LOVE FIELD DALLAS

PRUE 215 All-metal, exceptionally clean configuration was designed by Lockheed engineer Irving Prue. Fuselage is so shallow, pilot (Lyle Maxey) practically lies on back. Wing is very thin. Craft gives high speed with high gliding ratio.



CONVERTED TG-4 This Laister-Kauffman flattop was formerly two-placer.



ROSS-RANGER All-metal soarer has opaque canopy top to cut cockpit heat.

Three-view aspects of the "Maureen," new contribution of Brazil's soaring activity. Craft's fuselage has configuration similar to that of Breguet 900 (see page 24).

Brazil Introduces New Sailplane

McGraw-Hill World News

Sao Paulo, Brazil—A prototype glider designed and built by the Institute of Technological Research, Sao Paulo, has proved all flight tests and is now in use by the Polytechnic Institute Gliding Club.

A modified design along similar lines but having more simplified construction is on the drawing boards.

Designated the IPT-14 (Instituto de Pesquisas Tecnologicas, project 14) and christened the "Maureen" (Drake Hicks), the craft embodies conventional steel and fabric construction, with wing leading edge faced in thin pine.

The glider seats two in tandem, with the rear seat space recessed into the wing.

Wings are demountable, each section being held to the fuselage by two bolts.

Characteristics and performance of the sailplane are:

Wing spread	45.9 ft.
Length	24.6 ft.
Wing area	181.4 sq.ft.
Empty weight	484 lb.
Useful load	352 lb.
Wing load with:	
1 pilot	5.56 lb./sq.ft.
2 pilots	4.82 lb./sq.ft.
Max. gliding angle	1:21
Cruise speeds:	
with 1 pilot	44.6 mph.
with 2 pilots	50.8 mph.
Min. rate descent:	
with 1 pilot	2.9 ft./sec.
at speed of	37.8 mph.
with 2 pilots	2.31 ft./sec.
at speed of	43.4 mph.
Max. design tow speed	93 mph.
Max. safe dive speed	176.4 mph.

NOW! Aircraft can be fueled up to 600 g.p.m.

New Parker 2½" nozzle saves up to 80% of fueling time

For U.S.A.F., Navy and commercial fueling. Pressure drop only 7 p.s.i. at 600 g.p.m. Safety features prevent spilling.

Another Parker first! The first airplane to use underwing fueling—the Martin 202—is equipped with Parker units.

With more than 20 years experience in the manufacture of aircraft fuel system components, Parker is prepared to design fueling nozzles, receivers and automatic tank shutoff valves for any aircraft or commercial fuel handling systems.

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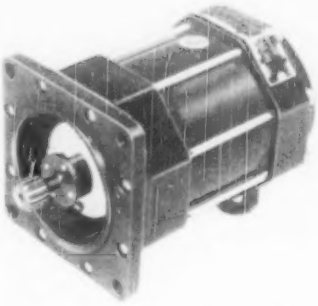
AVIONICS

Alternator Insures Gyro Power

Engine-driven standby device has simplified electrical circuits. Versions available for 27 or 115v. service.



Flight hazards associated with failure of power for gyro instruments now can be avoided with a simple permanent-magnet type of engine-driven alternator serving as a standby power source.

Use of this unit with a power failure indicator (Aviation Week, Aug. 7, p. 41) means a crude emergency electrical energy source with an adequate warning signal. When the indicator gives warning of low system voltage or failure of the power supply, switchover is made to the standby alternator for continuing gyro operation.

▶ **Two Versions**—The alternator, made by Pioneer-Eclipse division of Bendix Aviation Corp., is available in two types, similar in general construction, but differing in output voltages.

• **Type 1632-1** is primarily designed as a power source for gyro instruments having approximately 0.85 power factor. At this factor rating it is equivalent to a 27v., 400-cycle, 3-phase, 124-in. 25va output. Weight of the unit is approximately 6 lb.

• **Type 1631-5** is designed for electric gyro instruments having about 0.70 power factor, of which the rating is 115v., 400-cycle, 3-phase, 77-va output. Weight is about 9½ lb.

These alternators have no rotor winding, slip rings or brushes. Though they have neither voltage nor frequency regulation, they will maintain over a wide speed range the ratio of voltage and frequency required for satisfactory gyro operation.

▶ **Makeup**—Each type consists primarily of four basic components: the mounting head (drive-end head), stator assembly, rotor assembly, and back head (anti-drive-end head). The rotor assembly is supported in ball bearings pressed into the end heads, and rotates within the stator assembly.

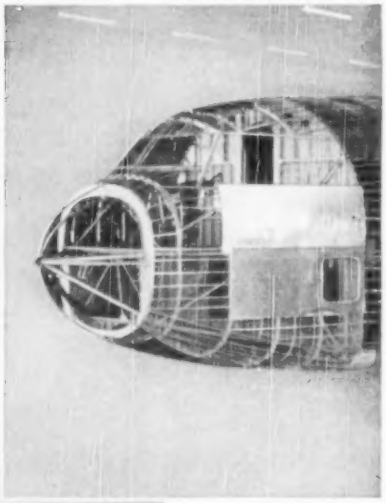
The drive-end head affords a standard mounting flange for attachment to the engine accessory drive pad. A recess is provided for insertion of one rotor support bearing, and a felt seal prevents seepage of engine oil into the alternator housing.

The removable drive coupling with rubber inserts absorbs engine torsional vibration, compensates for any slight drive misalignment, protects rotor and engine drive, and simplifies replacement of coupling.

The stator assembly consists of a number of laminations, with a ring of each end, held in a shell by rolled edges. Three coils are interlaced in the slots provided by the laminations. The starting ends of the coils are connected

(Continued on page 39)

Built to Take it on the Nose



The new Chase Aircraft XC-123 military transport employing a life guard of steel tubing to protect personnel in case of nose over or other accident.

A typical example of how steel tubing can be used for strength—dependability and safety.

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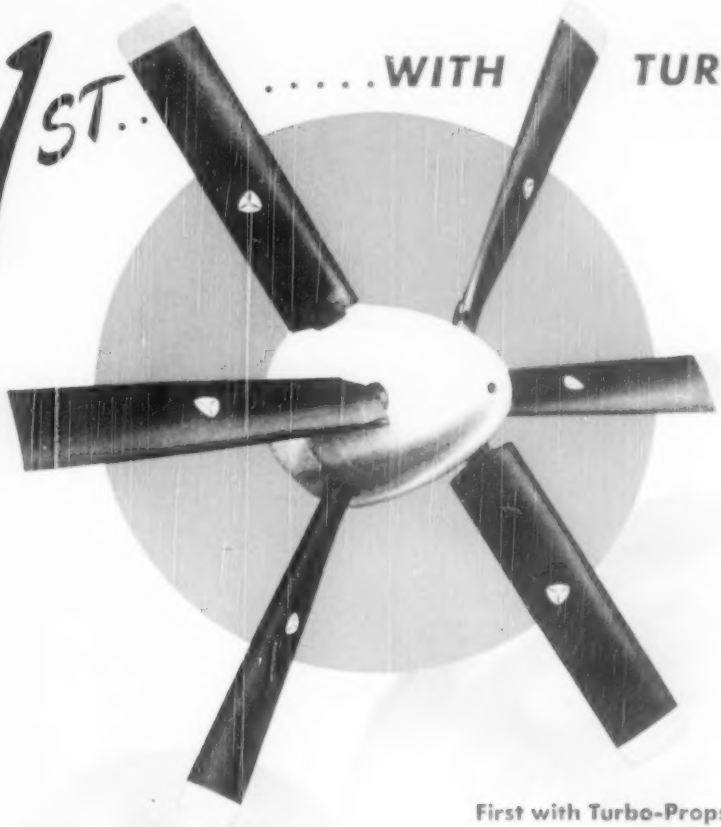

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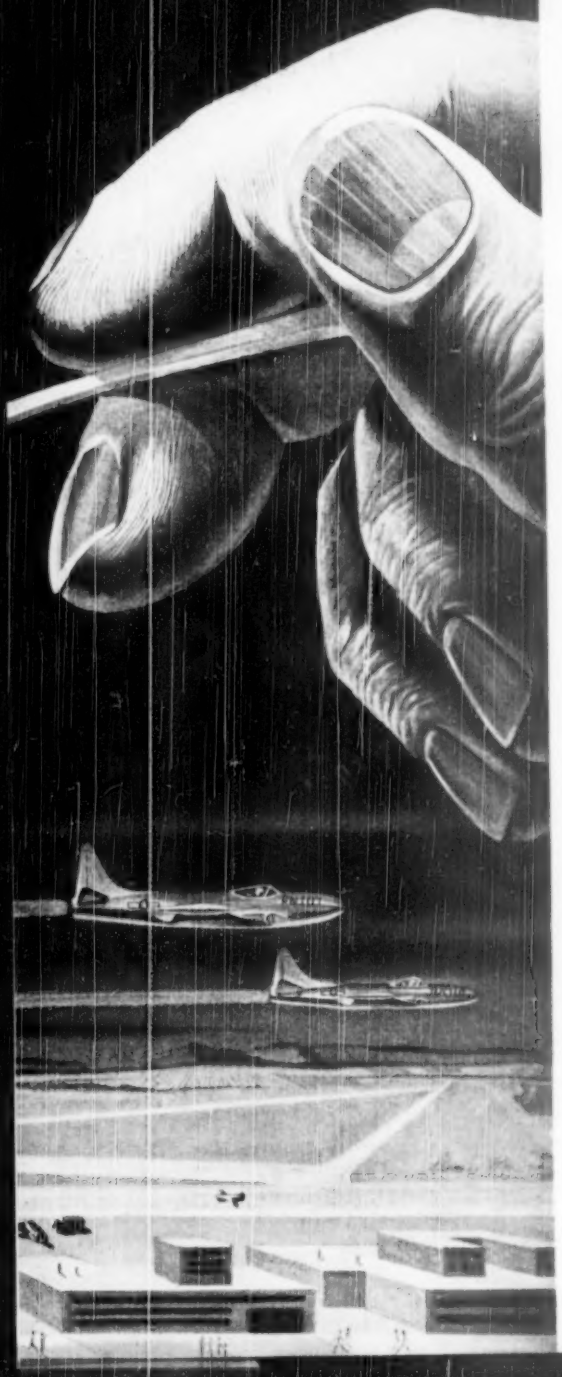
AIRPLANES

HAVE BIG APPETITES!



So BIG, in fact, that during the first half of this year the aviation industry consumed ten million dollars worth of materials every day. Today, it requires nearly twice this amount to fill the growing requirements of our national security. It takes over 165,000 separate items to put just *one* of America's planes in the air! Take a look at the list: avionics and photographic equipment, aluminum, magnesium, steel, copper, titanium, rubber, textiles, bearings, hardware, paints, tools, petroleum products, instruments, trucks, carts, fasteners, motors, generators and an infinite variety of electrical controls, miles on end of wire and cable, hydraulic systems and devices . . . and countless products of almost every known industry.

Everywhere alert manufacturers are doing or preparing to do their share in this vast program. More than half of this job of producing aircraft and replacement parts must be taken over by the country's sub-contractors and secondary suppliers.

The problem of supplying one of the world's biggest markets . . . is a *vital* and ever-growing task. You can help this program . . . your country and yourself . . . by investigating today the enormously growing sales opportunities offered by the aviation market.

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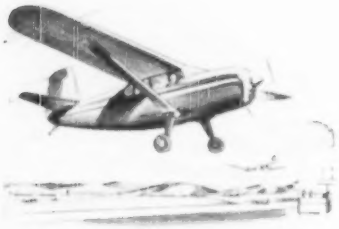

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IF IT'S quality you're after—if its quantity you want—if it's a special specification you need, Auto-Lite has the answer. In 39 years' experience, Auto-Lite research and advanced laboratory skills have assisted leading aircraft manufacturers in meeting difficult wire and cable problems. Today, the tremendous output of the new Hazleton plant, combined with the now increased facilities at the Auto-Lite Port Huron plant, makes it possible to accept additional aircraft wire and cable business. Money cannot buy better wire and cable.

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Aircraft Low Tension Cable aluminum conductor Specification ANC 161

HIGH TENSION

Aircraft High Tension Ignition Cable sizes 5MM, 7MM and 9MM Specification ANC 166a, also to commercial standards.

Magnet wire to Specification JAN-W-583 and commercial standards

A tapped lead from each coil is spliced to a lead wire to bring out reduced power for each of the three phases. The remaining end of each coil is spliced to a lead wire to bring out full power for each of three phases.

The rotor magnet consists of a magnetic-alloy casting held to a steel rotor shaft by a plastic material. Twenty poles are magnetized to provide alternate N-S units around the circumference.

A recess is provided in the anti-drive end head for insertion of the other rotor support bearing, and an electrical terminal strip gives connection of the stator coil leads and external wiring.

Ground Power Units

New auxiliary power units are rolling off the production line at Avco Mfg. Corp.'s Lycoming-Spencer division at Williamsport, Pa., to fill a substantial Air Force contract. Initial order was for 2500 of the ground power-carts, and additional orders have since been received, with negotiations under way for still more.

Used for starting turbojets, high-power piston engines, furnishing energy for checking electrically operated controls, instruments, radio, and radar, and charging batteries, these APUs were developed jointly by Lycoming and the Air Force. They are designed to operate under severe temperature extremes and have been proved by extensive testing at the Lycoming plant and Wright-Patterson AFB.

Heart of the units is a Lycoming 0-290-G4 four-cylinder air-cooled engine. Three models of the APU are:

- **C-21**, incorporating a dc generator and an ac generator;
- **C-22**, having one ac and two dc generators;
- **B-10**, with one large ac generator and a dc generator.

The C-21 and C-22 will be used for fueling jets, the B-10 for high-force power-plant pilots.

Chassis is a three-wheel, pneumatic-tired dolly. Rear axle is suspended on leaf springs. Front wheel is carried on a swivel yoke for low-bar turning. The unit is completely cowled, and thermostatically controlled shutters admit cooling air for the Lycoming engine. Operation is reported feasible in temperatures up to 130° F.

Also included is a speed-increasing connector directly to the engine and providing drives for the generators, a control panel carrying the necessary gages, switches, relays and associated equipment, and a gasoline heater capable sufficiently of warming the lubricating oil and batteries within 45 min. to permit engine operation at ambient temperatures as low as −65° F.

A model A11 Beechcraft Bonanza gets their Sales Managers to their destination in a hurry!

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TORQOMETERS

Guarantee Accurate Tensioning to the Exact Inch- or Foot-Pound . . . .

Guesswork tensioning is a thing of the past. Today, aviation engineers recognize the fact that in spite of precisioning machining, mechanical failure is often the direct result of distortion caused by varied degrees of tightness when pulling up bolts, studs, or nuts.

Snap-on's answer is the Torqometer. It enables any mechanic, husky or hard-muscled, to tighten any bolt, stud or nut, individually or in a series, to a pre-determined, uniform tension . . . accurately, conveniently.

Sizes available from zero to 80 in.-lbs., up to 2000 ft.-lbs. Available through any of the 800 Snap-on men working out of 41 Snap-on factory branches.

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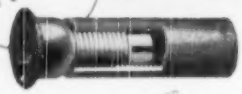

1 Drill one (1) hole.

2 Insert Lok-Skru with either Hand or Power Lok-Skru Tool.

3 With Lok-Skru Tool draw barrel over shoulder of Lok-Skru and flush with metal. This provides a Blind Anchor Nut for Secondary Attachments.

4 TO FASTEN ATTACHMENTS insert standard Machine Screw through hole in attachment and into Lok-Skru. As machine screw is tightened into Lok-Skru it is securely locked by means of the "Specially Crimped" locking end of the Lok-Skru.

Crimped internal threads of Lok-Skru provide secure locking device for attachment screw.

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FINANCIAL

Mail Rate Picture Still Muddied

Recent CAB decision excluding certain expenses in making rate calculations beclouds carrier outlook.

Lack of permanent mail rates for most certificated mail carriers is rapidly compounding old problems and developing new ones.

The greater part of the air transport industry is now operating under temporary rates of mail compensation. This gives an uncertain note to all results reported under this arrangement. In addition, this condition becomes involved with other entanglements unrelated to rate making. The greatest difficulty lies in the unsettlement of future management planning.

The Pan American-World Airways, Inc., trans-Atlantic mail rate proceedings offer an interesting study. More than 16 months ago, on Apr. 19, 1949, the Civil Aeronautics Board issued tentative findings and conclusions proposing final rates for services in the calendar years 1946-1948. Now, on Aug. 23, 1950, CAB comes forward and amends its previous findings to reflect treatment of tax items considered deductible for tax purposes but not recognized for mail rate purposes.

▶ **Surprise Recapture**—Regardless of the correctness of the Board's amended position, it does complicate matters for the carrier.

If it is allowed to become operative, the amended order will serve to reduce the mail compensation price credit awarded by a total of $57,4,120 covering the three-year period involved. But PAA's (financial statement) figures as much reflected the Board's April 1949 award.

Investment interests have relied on such financial statements for their investing determinations. The airline management is now given belated notice that $57,4,120 not only counted upon to be included in segments each now is subject to recapture. This cost of action does not make for financial stability, anyhow.

In its April 1949 action the Board included a tax item amounting to 38 percent of the credit accorded for mail rate purposes. Since that time, CAB has decided that it has never finalized consideration to the inclusion of the accounting tax item in computing mail rates. The tax allowance is considered as offset. The mail city becomes it is recognized as a cost for rate-making purposes.

In consequence, the tax allowance in previous cases, the Board finds that the basis used has many times resulted in making provisions for a greater amount of tax than would ever be paid by the carrier. In effect, this has served to underwrite costs never incurred. This condition results from the fact that, in many cases, the entity used for rate-making purposes is entirely different from that for tax purposes.

▶ **Different Approach**—The Board now proposes to use a different approach than it has in the past in approximating actual tax liability for computing the tax allowance in mail rates. This method simply entails reducing the profit margin computed for mail rate purposes by ignoring expenses, actually incurred by the carrier and considered tax deductible, but which will never be recognized for mail rate purposes.

CAB labels as typical expenses of this nature, entertainment, charitable contributions and "expenses not recognized because they result from inefficient or uneconomical management."

The last named category is an interesting one, as the Board has been reluctant to name specific expenses of this type. It also places the Board deeper into the position of calling management signals, a prerogative not generally in the purview of a "quasi-judicial" government agency.

▶ **Permanent Rate Needed**—The entire conflict again highlights the importance of establishing a permanent forward rate.

So equipped, an airline's management can proceed to use its best judgment in promoting its business, profiting or losing as a result of its own efforts. While this is an extremely favorable arrangement, it is by no means easy one to establish.

As long as a carrier receives any mail pay containing the digitized subsidy, it makes itself subject to Board ramming with its ultimate profits through the rate of mail compensation. Thus far neither the CAB nor any other group has been able to devise where a compensation rate ends and the subsidy begins.

With most of the domestic carriers now operating profitably, there is a lessening tendency on the part of some observers to appraise the effects of sending mail rate proceedings in these instances.

▶ "Big Four"—For example, the "Big Four" mail rate case involving American, Eastern, TWA and United, governing permanent rates of mail compensation going back to Jan. 1, 1948, appears to be in a hopeless impasse with no prospect for an early settlement of the matter.

Practically all of the carriers in this proceeding have prepared and submitted voluminous exhibits to the Board. A tentative hearing date has been set for early in 1951.

The CAB staff, however, is undermanned and may find it difficult to process this case with any dispatch. Complicating the problem is the attempt to find a common approach which will suit the requirements of the four carriers while meeting the objections of the certificated all-cargo lines and the Post Office Dept. On the surface, this appears to be a hopeless task.

▶ Boomerang—The whole set-up of filing for mail rate increases is sometimes subject to abuse and carries the threat of boomerang. For example, on Oct. 28, 1948, the Board established a permanent rate equivalent to a maximum of 22 cents per plane mile for the domestic routes of Braniff. But two months later, on Dec. 31, 1948, Braniff filed a new application seeking an increased rate of 30 cents per airplane mile. However, as earnings improved, Braniff, on April 4, 1950, sought to withdraw its petition for increased mail pay.

The Board took strong exception to this procedure of filing "protective" mail rate petitions. It recalled its previous admonitions that should a carrier file a protective petition and thereafter earn more than a fair and reasonable return, the rate order on such petition would take effect as of the date of filing and would result in refunding to the government of any mail pay in excess of that required to provide a reasonable return.

The Board further asserted that to do otherwise would destroy the incentive of air carriers to operate under permanent mail rates. Unless this principle is applied strictly, carriers, by filing protective petitions, would assure themselves a "cost plus or better" brand of profitability.

With this ruling, Braniff was in jeopardy of having its mail compensation reduced from the level established by the October, 1948, order. But after a detailed analysis, the CAB found there was no need to make any adjustments in the carrier's mail rate. It concluded the proceeding, not by allowing Braniff to withdraw its petition, but by issuing a regular show-cause order of its own.

This is simply another manifestation of the desirability of reaching a permanent rate and staying with it as long as possible.

—Selig Altschul

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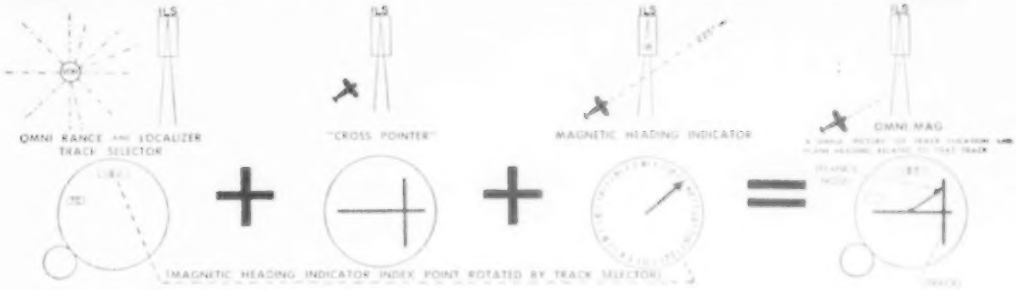

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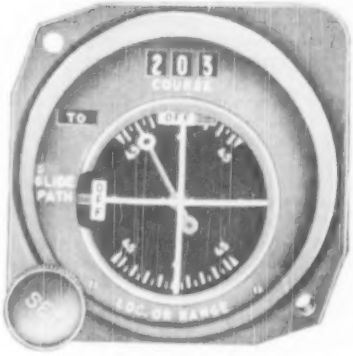

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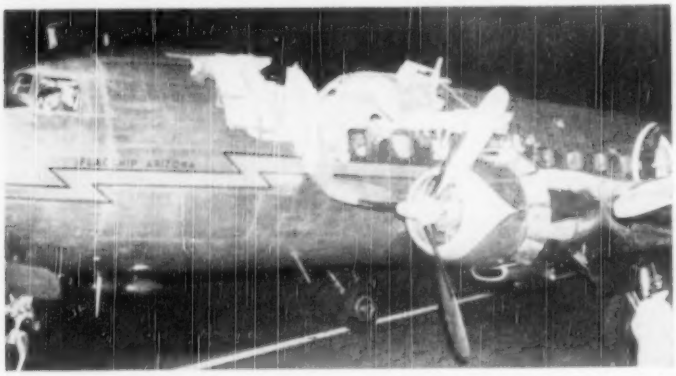


EXPLOSIVE DECOMPRESSION did much of the damage to top of the fuselage of this American Airlines DC-6 after an engine threw a propeller which pierced the fuselage.

Built-in Safety for Transports

Greater passenger, fuel loads, high altitude flights bring fire, evacuation, decompression worries.

By Charles Adams

Federal aviation officials are weighing new regulations designed to keep the safety factor of new transports on a par with the planes' greater size, speed and comfort.

The larger number of engines and increased fuel capacity of postwar transports have complicated fire prevention and control problems. Sharply increased passenger capacity has heightened the need for improved facilities for emergency evacuation in event of a crash. Cabin windows and doors must be made more secure to guard against the dangers of explosive decompression and loss of oxygen at high altitudes, especially above 30,000 ft.

Government agencies emphasize that they don't want to take an unreasonable approach to regulating more safety into airline transports. New rules adopted as a result of current studies will have a much greater effect on planes still on the drawing boards than those now in service.

▶ **Depressurization Hazard**—Effect of sudden (explosive) depressurization on passengers or crew members occupying seats immediately adjacent to the window in door that gives way has been under extensive study both in this country and abroad. As a result, many aircraft manufacturers now tend to pay more attention to these components and to consider them not as vital as the wings.

The Royal Aircraft Establishment, in cooperation with British plane builders, has conducted experiments showing that the area of violent suction resulting from a window blowout is quite localized.

A small dummy placed in a seat next to a shattered window went through the opening and out over the wing in a split second, even though the seat belt was fastened. A larger dummy too big to go through the window was jammed against the window frame with what would have been fatal violence to a passenger.

But dummies in the second seat away from the window were almost unaffected. It seemed possible that a person in the seat next to the window might survive a blowout if he happened to be leaning away from the opening at the time.

▶ **British Improvements**—De Havilland and Vickers have attempted to design windows and doors for the new Comet and Viscount transports that are blowout proof. The Comet's cabin door slides inward and upward when opening. When closed, the interior pressure tends to hold it in place.

In this country, the Civil Aeronautics Administration's medical research laboratory at Oklahoma City has made a motion picture showing the effects of sudden depressurization on passengers. The film was shown to industry personnel at the Civil Aeronautics Board's recent meeting to review airworthiness portions of the Civil Air Regulations.

U. S. airlines are taking steps to protect their customers from both explosive decompression in pressurized cabins and the hazard of losing a door or window from either a pressurized or unpressurized plane. Capital Airlines recently decided to have Sierracin panels installed in both the inner and outer windows of its five new Constellations. It also modified the "air stair" doors on its DC-3s to prevent inadvertent opening in flight.

▶ **Mishaps Listed**—Accidents involving sudden decompression of pressurized cabins and the inadvertent opening of doors have not been infrequent during the past several years. A number of the mishaps have resulted in fatalities.

Latest mishap involved an American Airlines DC-6 flying near Denver at about 21,000 ft. last month. No. 3 engine and propeller left the ship, and part of the prop tore a hole about 4 by 5 ft. in the forward part of the cabin, causing instant decompression.

Passengers reported a "boom and rush of air." One died, apparently of heart failure. But no one was close enough to be sucked through the opening. And the altitude was apparently not sufficient to cause serious discomfort from lack of oxygen.

A similar accident occurred in February, 1948, when part of the No. 3 propeller drove through the fuselage of an Eastern Air Lines Constellation cruising at 22,000 ft. near Bunnell, Fla. A purser in the galley area was killed by the prop, and the cabin was depressurized. But an emergency landing was made after No. 3 engine dropped off.

▶ **Window Fails**—Early this year, a sleeping stewardess was pulled half-way out of a Pan American Airways Constellation when a Sierracin plastic window blew out at 20,000 ft. during a New York-Miami ferry flight.

About the same time, a steward aboard a PAA Stratocruiser was lost near Central Islip, N. Y. He apparently had been investigating pressurization leak around the main door when it opened. The sudden depressurization caused some damage to the aircraft interior.

In March, 1947, a TWA navigator was sucked out of a Constellation over the North Atlantic when his Plexiglas astrodome burst at 19,000 ft.

Fatalities have also occurred when doors or hatches of unpressurized transports come open in flight. Loss of balance, rather than any strong suction, is believed to have upset these persons out. Near-misses include the case of an Eastern Air Lines steward who managed to hold on to the chain when a DC-3 door opened over Tampa, Fla., last February.

▶ **CAB Proposals**—Meanwhile, a recently issued memorandum from the Director of CAB's Bureau of Safety Investigation to the Director of the Bureau

of Safety Regulation states flatly that "a careful examination of fire accidents since four-engine aircraft came into general civil use leads to the conclusion that the safety level for passengers has not kept pace with other aircraft developments. Study of these accidents points to corrective recommendations which would materially improve the passengers' chances of survival in types of mishaps that are now proving fatal to all or a high percentage of those involved.

"The large quantities of fuel carried on modern transports make fire after a crash the rule rather than the exception. With the advent of jets the situation is likely to become worse. The immediate approach to protecting passengers lies in developing all means possible for evacuating them successfully."

▶ **Crash Protection**—CAB safety officials feel that crash injury protection for passengers must be provided so that they not only can survive most crash landings but can help themselves afterward. Crash fire protection must stop or delay any fire long enough for passengers to make their escape. And emergency exits must be provided in sufficient number, size and dispersion to insure evacuation without delay or outside help.

Board records contain many cases in which fatalities resulted in otherwise survivable accidents as a result of seat belts failing and seats leaving loose on crash impact. Present Civil Air Regulations require a transport category aircraft to be stressed for a crash load factor of 6G. U. S. Navy, since 1945, has used a 40G crash load factor, and the Australian Department of Civil Aviation has proposed a 25G requirement.

CAB's Bureau of Safety Investigation believes 16G to be wholly inadequate and wants a minimum of at least 20G forward crash load factor for seat belts, seats and seat carry through structure. The human body can take much more than the load imposed by a 20G belt without ill effects, and safety officials contend that no unreasonable weight handicap will be imposed by the different requirements.

▶ **Rearward Seating**—The bureau feels that rearward seating is practical if the seat and seat carry through structure are strong enough to withstand the crash stresses. But it did not make any specific recommendation on the subject.

Instead, the bureau urged that no seats on new transport category aircraft be approved for occupancy during take-off and landing unless they face either fore or aft. Side seating, so prevalent in nonscheduled bucket-set planes right after the war, has now been eliminated almost completely in U. S. commercial air transportation. However, there are still cases of side seating for the factory.

Other recommendations made by CAB's Bureau of Safety Investigation for application to all new transport category aircraft certificated after Oct. 1, 1951, are:

• **Each engine and each heater** should be provided with crash fire protection which will release automatically all contents of extinguishing agents to all engines and heaters at a predetermined deceleration force. This system must also include provision for selective manual operation in flight.

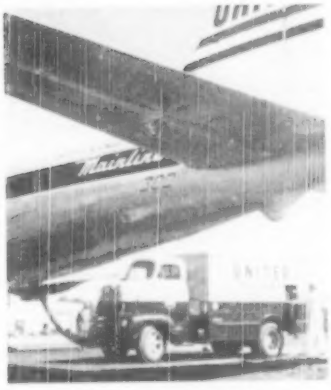
The automatic system would supply immediate fire protection even if the crew is incapacitated in the crash landing and, therefore, unable to manipulate a hand-operated fire extinguishing system.

Present practice in the U. S. is to place the fire extinguishing agent in some central location and distribute it through a selective valve system to the points throughout the aircraft where needed.

But all this extensive plumbing and valving might become inoperative in a crash. British Governor system of fire protection is now for test years along the lines suggested by the CAB bureau.

• **Landing gear** should be so designed that in event of landing gear failure the chance of puncturing a fuel tank is minimized. (To avoid this possibility one airline has replaced the gear of its DC-6s and the CAB bureau thinks other carriers should follow suit.)

• **One emergency exit** should be required for each cabin emergency exit.



COOL COMFORT

This mobile air conditioner, said to be the largest set developed for commercial aircraft, generates 2000 cu. ft. per min. of cool air for United Air Lines DC-6s so that passengers can enjoy maximum comfort during stops. Unit can also deliver 250,000 Btu when adapted as a heater. UAL ground equipment engineers worked with Chrysler Air-Temp and International Harvester in designing and developing the conditioner. It is shown with hose attached to the plane while ramp serviceman adjusts controls.

These exits would be distributed on both sides of the passenger compartment as evenly as practicable to provide the most expeditious exit.

Present regulations require that transport aircraft be capable of being evacuated in 90 seconds, or a time equal to one second per occupant, whichever is greater. The bureau feels that this is unrealistic, since a fire will develop just as rapidly whether there are 30 or 60 persons aboard the plane.)

• **One full sized door** must be installed in the rear of the cabin. (There is now some tendency to place the main door forward of the wing. There have been many accidents in which the fuselage has been demolished forward of the wing's leading edge, while the rear section has received little damage. This is likely to make the forward door inoperable, whereas chances of passenger evacuation from the rear might be favorable.)

• **Transports accommodating** 25 or more passengers should be required to have a minimum aisle width of two feet. (At present, whenever everybody in an airline moves into the aisles they become badly clogged. This is particularly true on high capacity air coach planes.)

• **Minimum size of each emergency exit** should be such that the average size passenger can get through in a frontal facing position. Minimum size of each exit door should be not less than two feet by three feet. (In an urgent accident, passengers become stuck in an exit door and fail to be pulled through from the outside.)

• **To prevent seats from blocking an** exit, bottom of the opening must be even with the top of the chair arm.

• **All rear cabin doors** must open outward and all cabin door and exits must be operable from both inside and outside the fuselage. Door should be standardized so far as practical as to method of functioning. (Doors and emergency exits have frequently been jammed shut by deformation of the fuselage in a crash. They have been complicated and difficult for passengers to learn how to open. Some open in one manner and each type differs in detail in latching mechanism.)

• **Where normal distance from door** to ground permits, the plane should be equipped with rear cabin doors of the door type, hinged at the bottom. Where the distance is too great, escape slides of sufficient length to reach the ground under the most adverse conditions should be provided.

• **Nylon or similar type** rope or other means of rearline the ground should be permanently attached to each exit and door. (Present regulations require escape ropes only if the exit is 10 ft. or more above the ground with the gear retracted.)

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• **Adequate emergency lighting system** should be provided with current supplied by batteries and operated by an inertia switch. (In one recent accident, passengers said they would have been unable to find the exits but for the light from the fire of the burning plane. The CAB Bureau of Safety Investigation feels that fluorescent paint alone is not sufficiently bright for marking exits.)

Transports Adopt Safety Features

Increased margins of safety for passengers will be incorporated in both the Douglas DC-6B and the Lockheed Super-Constellation.

Safety belts for the DC-6B will meet the new CAA strength requirements. Pilot seats and all passenger seats will be strengthened to withstand a 6G load. All equipment attached inside the plane's cockpit or passenger area (anything that conceivably could come loose) and fittings, will also be upped to withstand a load of at least 6G.

The Model 1049 Super-Connie will have 70% more visual area as a result of Lockheed's change to large rectangular windows. Windows in the Super-Connie will be double Sierracin panels, each panel capable of holding normal pressurization.

Present design calls for eight emergency exits.

Seat belts will conform to NAS 802 and Technical Service Order C-22. Lockheed hasn't chosen the seat belt manufacturer yet. Company will consider customers' preferences in order to maintain uniformity in fleets. All seat belts, however, will meet ICAO standards.

Pilot seats will be designed to conform with Civil Air Regulations in addition to ICAO standards.

Lockheed's Constellation last year was the first transport to be certified by the CAA as meeting ICAO standards.

Boeing Field C-46 Crash Report Issued

CAB investigators have reported that probable causes of a crash of Air Transport Associates, Inc.'s C-46F transport at Boeing Field, Seattle, were pilot indecision and the use of 91-octane fuel for takeoff.

Contributing cause was that runway threshold lights at far end had been moved in, making field appear shorter than actual usable length.

Crash caused the death of two passengers. The plane was carrying 28 passengers and crew of four.

Captain Merle Edgerton, pilot, reported partial power loss on takeoff, along with sputtering, backfire, and torching of the left engine. At 20-feet altitude he throttled back and landed. He actually had 3000 feet left. But the threshold lights had been moved in 1300 feet because of minor runway repairs. So the pilot thought he could not stop safely in the 1700 feet he saw between him and the lights. He took off again and some 1300 feet beyond the end of the runway the plane struck a 20-ft. pole, just two feet below the top. The accident happened July 19, 1949.

The pilot used 91-octane fuel for both run-up and takeoff, although center tanks were filled with 100-octane. The high-octane tanks were not used for takeoff because the left center fuel booster was inoperative.

CAB further found:

• **None of the three pilots** in the plane had received flight check in the type.

• **Takeoff power settings** used were far above those allowable for 91-octane fuel; this may have been immediate cause of engine malfunction.

• **Engine was obsolete** Pratt & Whitney R-2800-75; no instructions other than Army technical orders were published for maintenance of engine. Maintenance personnel said they had trouble getting these.

Port Authority to Spruce Up Idlewild

Port of New York Authority commissioners have approved going ahead on some trimmings for New York International Airport (Idlewild). At an estimated cost of $735,000, a new ten-story permanent control tower will be put up replacing the present inadequate temporary structure.

The new tower will be about 145 ft. high and measure about 40x50 ft. at the base. Seventh, eighth and ninth floors will provide office space and the top floor will comprise the glass-enclosed control room.

The board also approved construction of a permanent fuel storage facility at the field to augment the present storage capacity of 600,000 gal. Bids will be asked on this project to be built in two phases. Phase I will cover installation of two 210,000 gal. tanks and required piping and equipment; the next step will encompass putting in six 504,000-gal. storage tanks, pipes and equipment, an administration building, truck garage and pumphouse.

▶ **First Bids In**—Four bids have been received on Phase 1—these cover furnishing and installation of two tanks, but do not include appurtenances. Low bid—$31,150—was entered by Hammond Iron Works, with completion time of 175 days. Port Authority will probably announce winning bid soon.

Authority officials also authorized purchase of a $24,500 Hiller 360 helicopter for use as a staff taxi by operations and engineering personnel traveling between its four major airports in the New York-New Jersey area. It's estimated that use of a copter will slash present best ground travel time of about two hours between Newark Airport and Idlewild to about 20 minutes.

PAA Wants Route Case Reopened

Pan American Airways wants the Civil Aeronautics Board to reconsider part of last month's decision which denied the carrier's application for domestic routes.

The case should be reopened insofar as it rejects the application for a Boston-New York-Philadelphia-Baltimore-Washington-Miami route, PAA declared. It thinks a decision on this bid should be delayed pending outcome of CAB's National Airlines route investigation. The Boston-Miami link was recommended for certification to Pan American by a CAB examiner two years ago.

PAA emphasized its belief that CAB was "unfair and discriminatory" in refusing to grant the company's request for transcontinental routes, for links connecting Chicago and PanAm's southern gateway to Latin America, and for a route along the Pacific Coast connecting Pan American's gateway points in that area. But the carrier said it did not seek reconsideration of this part of the decision.

Flying Tigers Make Good Showing

The Flying Tiger Line has provided proof that a scheduled all-cargo carrier with well-developed auxiliary activities can turn in a handsome profit to its stockholders.

Certificated for transcontinental freight routes in August, 1949, the Tigers reported a $490,846 profit for the fiscal year ended June 30. The earnings included a $174,000 tax credit.

The 1949-50 fiscal year saw the company pass the $5 million gross revenue mark for the first time since it was organized in 1945. In 1948-49, revenues were $2,962,000, and net profit was $123,619. The past year's profits were equal to 64 cents a share and more than wiped out the $349,000 deficit suffered in 1947-48.

▶ **No Military Work**—President Robert W. Prescott pointed out that fiscal 1949-50 earnings were achieved without benefit of military contract work for the government. However, the company did derive a substantial part of its revenues from maintenance and leasing

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Temperature range to +550° F.

No special tools needed—use standard 12-point socket or box wrenches. Designed for use in cramped quarters

Sizes from ¼" to ¾" NF Thread Series

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The one-piece FLEXLOC is both a stop and a lock nut, due to its resilient segments which lock positively, even under extreme vibration. Torque is unusually uniform—within a few inch pounds. "Thin" and "regular" types; NC and NF threads. Officially approved by many U. S. depts., bureaus, etc., and CAA for aircraft use.

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its equipment to other carriers.

Net earnings reported by the Tigers are currently running at a rate in excess of all but nine of the 19 major certificated, "subsidized" airlines, Prescott declared. He said that among the all-cargo carriers the Tigers have the only profitable freight operation. (Note: Slick Airways recently has been showing a profit.)

Revenues during the current (1950-51) fiscal year will be affected substantially by military contract operations. Six of the carrier's DC-4s are now engaged in the Pacific Airlift.

▶ **Healthy Finances**—Prescott emphasized that his company is now in a strong position to exploit its freight franchise.

The Flying Tiger fleet has been increased from six to 24 planes during the past year.

And the Tiger's transcontinental freight stations in the same period increased from six to 20.

It's overseas operations have also been expanded to permit charter and face flying in South America, Europe, the Middle East and Asia.

The Tigers' current assets total $1,418,000 against current liabilities of $795,061. And the company's $623,000 in net working capital represents a $260,000 gain over the previous year.

SHORTLINES

▶ **Aerovias Guest**—Will start service to Miami on its route between Mexico City and Europe about Sept. 18. The Mexican carrier has been using Miami as a fuel stop for some time but only recently received Civil Aeronautics Board permission to handle traffic there.

▶ **American**—Company's service to Abilene and Big Spring, Tex., has been suspended by the Civil Aeronautics Board for five years to strengthen traffic generated at these points by Pioneer Air Lines, whose feeder certificate was recently extended to 1954. Continental Air Lines' service to Big Spring was discontinued for five years.

▶ **Civil Aeronautics Board**—Has decided that proposals by Braniff Airways, Continental Air Lines and Pioneer Air Lines to permit carriage of excess baggage aggregating more than 26 lb. at one-half the present rate should be canceled as being unreasonably low.

▶ **Eastern**—Has signed a contract with the International Association of Machinists providing a 10-cents-an-hour wage increase for 2500 ground employees. Half of the raise is retroactive.

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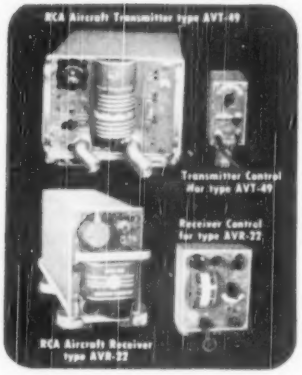

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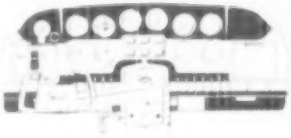

You enjoy many extra features. For instance, a functionally designed instrument panel, highly efficient . . . but handsome, too! Touches of luxury and comfort everywhere—even to coat hangers, ash trays, map pockets.

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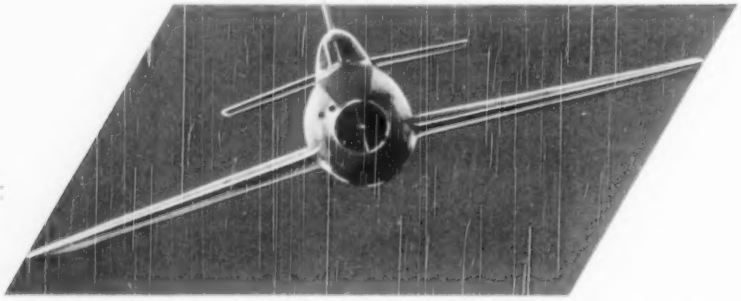
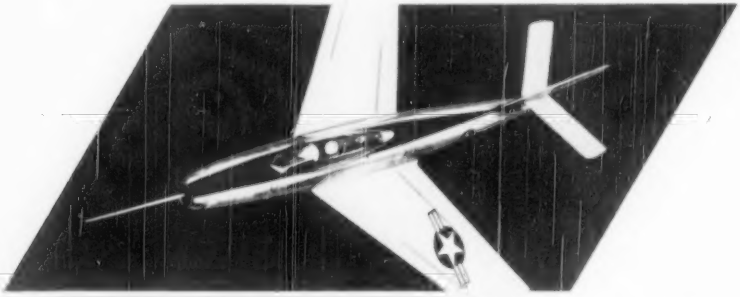


VERSATILITY in performing any required combat mission to contact the enemy successfully and conquer him



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to Jan. 1, 1950, and the other half to Sept. 1, 1950. IAM took a strike vote at Eastern before agreement was reached on the new pact.

▶ **Inter-American Airways**—Has had its letter of registration as a large irregular carrier revoked for operating more flights than permitted by the nonscheduled exemption. The Miami Springs, Fla., carrier, which has been active on the New York-Miami-Puerto Rico run, was ordered to cease and desist from further violations of the Civil Aeronautics Act.

▶ **ICAO**—The International Civil Aviation Organization, at a special meeting in Paris, is attempting to write more modern climb performance requirements for aircraft engaged in public carriage of passengers on international routes. Object is to take into account the varying operating conditions existing at airports throughout the world.

▶ **Linee Aeree Italiane**—The Italian carrier has taken delivery on the first of three new DC-6s to be used in trans-Atlantic service.

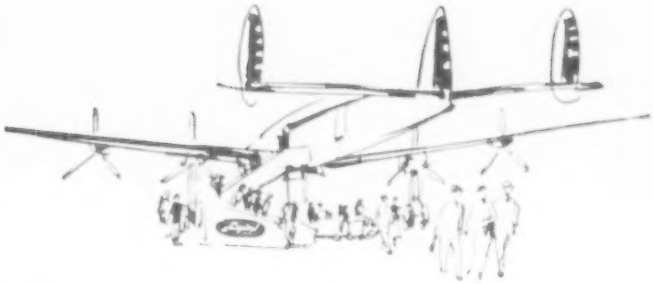
▶ **Mid-Continent**—Plans to inaugurate service over its new routes between Chicago and Sioux City, Ia., and between Rockford, Ill., and Milwaukee on Sept. 26. Intermediate stops on the Sioux City-Chicago link will be at Waterloo and Dubuque, Ia., and Rockford, Ill. CAB awarded the routes to Mid-Continent on Aug. 1 after Parks Air Lines, which originally held the certificate for them, failed to inaugurate service.

▶ **Ozark Air Lines**—Expects to inaugurate service shortly on its new feeder routes serving 42 cities in Missouri, Kansas, Oklahoma, Arkansas, Tennessee, Kentucky, Indiana, Illinois and Iowa. The short-haul system consists of links originally granted to Parks Air Lines and awarded to Ozark last month. Ozark's base of operations will be St. Louis, according to President Laddie Hamilton.

▶ **Pan American**—Has received Civil Aeronautics Board permission to suspend service to Prague, Czechoslovakia, until July, 1952. PAA has been serving Prague since 1946, but traffic has decreased sharply in recent months.

▶ **Post Office Dept.**—Has ordered an partial post rates increased effective Oct. 1.

▶ **Pioneer**—Reports August traffic was the best in its history. The feeder carried 12,215 passengers during the month.



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► **Sabena**—Has contributed a second DC-4 with double crew to the United Nations' Pacific Airlift.

► **Slick**—Company officials indicate that the all-cargo line may earn $500,000 this year—the first profitable 12-months period in its history. Carrier has been in the black since May on both its freight and maintenance services. August volume of 4,982,000 freight ton miles set a new industry record. Much of the additional business was from war shipments. Slick's fleet now includes 24 C-46s.

► **TWA**—Reported record business over the Labor Day weekend. Passengers carried on international routes gained 79 percent over last year, while domestic volume was up 15 percent.

► **United**—Expects to inaugurate Los Angeles-Honolulu service about Oct. 2. . . . UAL also had the heaviest holiday traffic in its history over the Labor Day weekend.

CAB SCHEDULE

Sept. 18—Oral argument in Michigan-Wisconsin service case. (Docket 2832 et al)

Sept. 20—Prehearing conference on TWA-Continental interchange agreement. (Docket 4544)

Sept. 21—Prehearing conference on Mid-Continent Airlines' request to serve Lincoln, Neb. (Docket 2949)

Sept. 25—Hearing in Havana-New York foreign air carrier permit case. (Docket 3213 et al)

Sept. 25—Prehearing conference on renewal of Wisconsin Central Airlines' feeder certificate. (Postponed from Sept. 11. (Docket 4587 et al)

Sept. 26—Prehearing conference on applications for service in Kansas. (Dockets 4573, 4674, 4676, 4637 and 4339)

Sept. 27—Prehearing conference on American Overseas Airlines mail rate case. (Docket 4668)

Oct. 2—Hearing on renewal of Frontier Airlines' feeder certificate. (Docket 4340 et al)

Oct. 4—Hearing on CAB's investigation of Eastern Air Lines' proposed Miami-San Juan coach fare. (Docket 4505)

Oct. 9—Hearing in Latin American air freight case. (Docket 2888 et al)

Oct. 10—Oral argument on new southern service to the West. (Docket 4102 et al)

Oct. 10—Prehearing conference on service to Mason City, Iowa. (Postponed from Sept. 18. (Docket 2303)

Oct. 16—Hearing on TWA and American Overseas Airlines requests to suspend service at Philadelphia on trans-Atlantic routes. (Postponed from Sept. 18. (Docket 4228 et al)

Oct. 16—Hearing on extension of Los Angeles Airways' helicopter mail certificate and for additional authority to carry passengers. (Docket 2400)

Oct. 30—Hearing on Lehman Brothers' interlocking relationships case involving partners of firm holding airline directorships. (Postponed from Sept. 11. (Docket 3605 et al)

Nov. 7—Hearing on application of Compania Dominicana de Aviacion for foreign air carrier permit from Ciudad Trujillo, Dominican Republic, to San Juan and Miami. (Docket 4264)

Dec. 11—Hearing on CAB's investigation of West Coast passenger fare structure. (Docket 4588)

Jan. 8, 1951—Hearing in Big Four mail rate case. (Docket 2849 et al)

LETTERS

He's a Proud Man

Flying Cargo, Inc., has become the first international air freight forwarder to receive full certification as an Indirect Common Carrier for International Air Transportation.

This is pursuant to Civil Aeronautics Board ruling adopted under the Civil Aeronautics Act of 1938.

Flying Cargo, Inc., was organized as J. G. Henwood Co. in 1946 and changed the name to Flying Cargo, Inc., in 1948 to act as an agency for all certificated international airlines.

A branch office was established in Hong Kong in September, 1949, in anticipation of the certification by the CAB. This important location was selected because of the specialization of this firm in Far East shipments.

Unlike the Domestic Air Freight Forwarders Docket of the CAB, the international air forwarders are subject to rigid requirements, and after all the requirements have been met the Board must act on each individual and render a decision. The certification of Flying Cargo, Inc., will mean a great deal to the exporting firms in the United States by cutting their costs on sample shipments and small orders of less than 100 pounds as the tariffs of Flying Cargo are as much as 12 percent below the regular direct air carriers services.

Any space given to the above will be sincerely appreciated.

JOHN G. HENWOOD, President
Flying Cargo, Inc.
140 Cedar St.
New York 6, N. Y.

(AVIATION WEEK welcomes another historic "first" in commercial air transportation—ED.)

RFC Inquiry

During the course of its recent hearings with respect to the lending policy of Reconstruction Finance Corp., this subcommittee had had the occasion to discuss the loan to Northwest Airlines. It seemed pertinent to the discussion to include in the hearings an article which appeared in AVIATION WEEK, Financial Section, on June 19, 1950. The article was written by Selig Altschul and it was entitled "CAB Aids Airline Securities Rule."

The hearings, which will include the article, will be available for distribution in a matter of a few weeks, and at that time, we will send you a number of copies.

THEODORE HERZ
United States Senate
Subcommittee on Reconstruction Finance Corp.
Washington, D. C.

Easier Stripping

We note with interest your article entitled "Easier Way To Strip Fuel Tanks" on page 43, AVIATION WEEK, June 5. While we have no feud with our competitor in developing comparable materials to ours, the sound of the article referred to would indicate that this is a new method that has been devised only by the company in question.

We attach a descriptive list of sealing materials which have been developed and used for over four years in swelling and breaking the bond of the sealants involved or by taking them into solution, and they consist of both spray-on type and fill-and-drain type. Over 50,000 gallons of both types of these Victory brand materials have been manufactured and delivered by this company during that time.

We are the originators of the fill-and-drain method of stripping integral fuel tanks. If you will note, we can take any sealant material and break the bond by fill-and-drain method. In addition, after the tank has been drained of the detacker, it can be thoroughly washed out, leaving no residue, with cold water.

In order that your readers may not have the wrong impression, we believe that a clarification should be made covering the article plus the materials involved.

D. H. JACKSON, General Manager
Jackson Chemical Co. of California, Inc.
6920 South Stanford Ave.
Los Angeles 1.

(AVIATION WEEK intentionally implied that the action of Turco's 2822 "bond release" stripper was something new developed by that company. Reason: Jackson Chemical Company's product, VCC X-35L breaks the bond by swelling sealant; Turco's 2822 does the job, not primarily by swelling sealant but by penetrating through it to the metal and working between the metal and the sealant—a new and different approach to the problem.—ED.)

Scoop Verified

Confirming our wire of Aug. 28, this will advise that CAA contract No. CA-50-2327 has been officially amended to call for 13 sets of PB-10s and FPCs.

On July 17 AVIATION WEEK broke this story, but at that time the CAA contract called only for one complete set, but included an option for 12 more sets. We are happy to report that these 12 sets have now become a reality, instead of a mere option.

Incidentally, your article has been instrumental in creating considerable discussion on this type of equipment in technical circles of the aviation industry, and we want to take this opportunity of expressing our sincere thanks to your equipment editor, George Christian, and to AVIATION WEEK for rendering what we feel is a definite service to the industry and the flying public by bringing to their attention the story of one of the most modern developments for increasing safety and reliability of all-weather flight—the story of PB-10 and FPC.

I am sure you will be happy to know that as a direct result of your article, we have had numerous calls from various aircraft manufacturers and airlines, including foreign operators, and have had specific requests for more information from the British Embassy and the Australian Department of Civil Aviation.

CLARK SMITH, Advertising
Eclipse Pioneer division
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Teterboro, N. J.

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(Continued on page 54)

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P-5862, Aviation Week
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W-5865, Aviation Week
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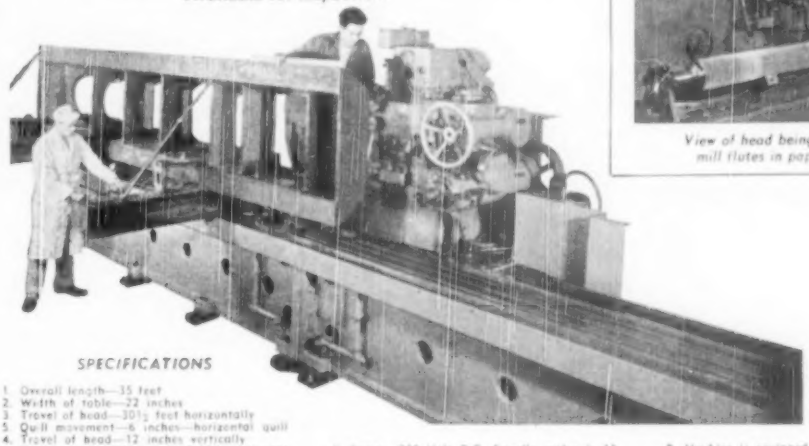

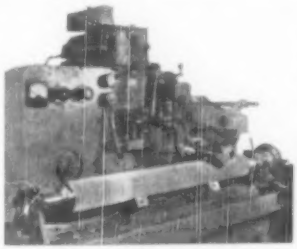

View of head being used to mill flutes in paper roll.

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5. Quill movement—6 inches—horizontal quill
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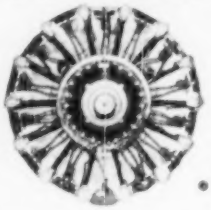

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What's Ahead in Congress

▶ **100 Group USAF?** The authorized ceiling on Air Force strength of "not to exceed 70 groups" will be lifted, probably not long after the new Congress convenes in January. Talk now is of a USAF approximating 100 groups, possibly upwards of that. It would be implemented by the $10- to $15-billion supplemental now in the mill at the Pentagon. The "not to exceed" wording was insisted upon by the Budget Bureau, an arm of the White House.

▶ **Secretary for Air Thomas Finletter** speaks regards the Truman-Johnson impounding of $735 million for aircraft procurement and cutback from a 58- to a 45-group program in 1950 fiscal year. Resigning Defense Secretary Johnson still doesn't—or so he says. Although the expanded program would have had little effect on the Korean war, Finletter points out, "there would have been a build-up toward the kind of force which is to be necessary" for the situation the U. S. faces.

▶ **European Aircraft.** The U. S. is going all out to spur reactivation and construction of plants to increase European plane output. Funds in the $5.2-billion Mutual Defense Assistance Program for this year can't be spent for new factories abroad. But the Department of Defense will spend $475 million on production equipment to increase capacity. Aircraft capacity is No. 1 on the list. The department estimates it will be able to increase European plane output by $607 million by furnishing factory equipment. It could also increase European Electronics output by $134 million. Labor supply, cheaper prices, and the submarine menace that would be encountered in shipping equipment to Europe in a war were factors in the U. S.'s decision to push European military plant expansion.

▶ **Electronics Equipment.** USAF will purchase $90 million for shipment to European countries. This adds onto the $1062 million which Navy and Air Force will spend for electronics equipment for their own forces.

▶ **Chairman Omar Bradley** of the Joint Chiefs of Staff will be given his fifth star enthusiastically by Congress—the fourth ground officer to make the honor. The Senate voted him the fifth star last week. Similar action by the House is expected. Only one USAF general, the late Hap Arnold, has made it, and, only one naval man, Adm. Chester Nimitz. The Pentagon sought to use popular Bradley as a wedge for more top-level men. It asked for legislation giving every Chairman of the Joint Chiefs of Staff five stars, but won't get it.

▶ **Battleships Again?** Rep. James Van Zandt, a member of the House Armed Services Committee and a Naval Reserve captain, reports that "very definitely" the Navy is contemplating building battleships equipped to launch guided missiles.

▶ **Plant Reactivation.** Senate Armed Services "Watchdog" subcommittee, headed by Sen. Lyndon Johnson, is prodding the Department of Defense to move ahead with plans to reactivate aircraft and other defense plants now on standby status. The department reports reactivation will cost approximately 20 percent of the plants original cost. The subcommittee has urged preparation of detailed estimates.

▶ **Surplus Engine Sales.** Air Force took a verbal whipping in the Johnson subcommittee's first report for continuing sales of aircraft engines, radio equipment, air compressors, and plane motor parts as useless "scrap and rags" for weeks after the Korean outbreak. The subcommittee also emphasized it didn't like the "brush-offs" it got from USAF when it was investigating the sales at Robins AFB in Georgia.

▶ **Donald Cook,** Securities and Exchange Commissioner on leave to serve as counsel of the Johnson subcommittee, was a staff director of the House Naval Affairs Committee, whose profits investigations during the last war lead to enactment of the renegotiation law.

▶ **Prototype Testing.** CAA can—although it has no plans for this now—use funds under the $12.5-million prototype testing program to pay for testing of foreign aircraft or engines. Authorization for the program, already approved by the Senate and the House Interstate and Foreign Commerce Committee, will probably be sent to the White House shortly. Funds will still have to be obtained, though, before the program can move ahead.

▶ **Airline Worry.** Airlines may have a heavy burden of transporting immigrants back home, without charge, thrusted on them. The security bills now pending in Congress require that if, within a period of five years, the U. S. decides it wants to deport an immigrant, the airline or steamship company that brought him here must transport him back. The airlines and steamships are fighting the provision. Under present law, airlines only have to transport back immigrants not accepted on this side on their arrival. They have grumbled against this, claiming that if a U. S. consul abroad issues a visa, they should not have to assume a financial responsibility because the visa isn't honored on this side.

▶ **Separation Study.** Senate Interstate and Foreign Commerce Committee's chairman, Sen. Edwin Johnson, has set Sept. 23 as the deadline date for bids on a contract to make studies and draw up a plan for separation of airmail pay and subsidies. It will have to follow the three-way breakdown recommended by Johnson: compensatory payments to carriers, subsidies to carriers, subsidies to towns for uneconomical service. Feb. 28 is the deadline for completion of the plan. Johnson has $200,000 for the project.

▶ **United Air Lines** contributed $3000 to the $218,160 Air Transportation Association of America collected during the first half of the year to put across a program for a sound transportation system as a safeguard against government ownership, according to TAA's lobby registration report. UAL was the only aviation contributor. Railroads turned over more than $60,000, including $5000 by Association of American Railroads. Other contributors were the big industrials and banks.

People

• **Rep. Mike Monroney,** the Oklahoma Democrat who defeated Sen. Elmer Thomas in the primary, has been a staunch supporter of the 70-group USAF. As chairman of the Senate Appropriations Subcommittee on the Armed Services, Thomas engineered Senate opposition.

• **Rep. Carl Hinshaw,** the California Republican who served as vice chairman of the 1948 Congressional Aviation Policy Board and has specialized on promoting aviation on Capitol Hill, is in for another term. He won both party nominations in the California primary.

• **Hal Davis,** long-time staff member of Senate Commerce Committee's Aviation Subcommittee, has been detailed to the Merchant Marine Subcommittee.

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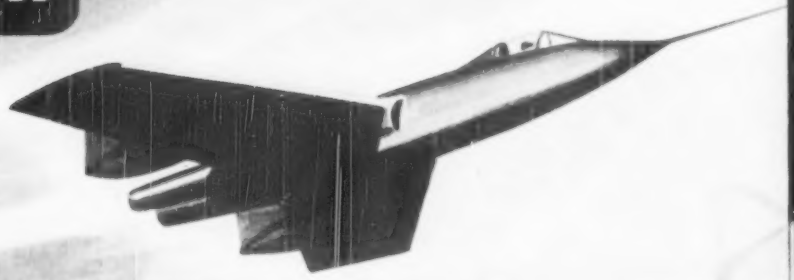

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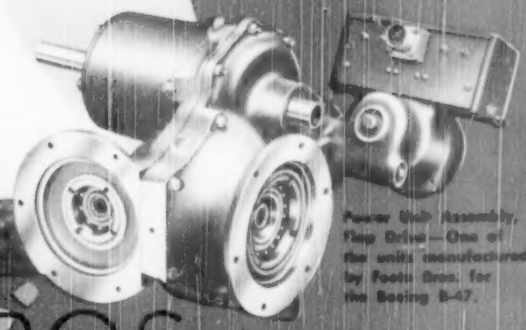

Power Unit Assembly, Flap Drive—One of the units manufactured by Foote Bros. for the Boeing B-47.

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